ECOLOGICAL SURVEY REPORT

SAWMILL MOUNTAIN CANDIDATE RESEARCH NATURAL AREA

LOS PADRES NATIONAL FOREST, MT. PINOS RANGER DISTRICT
VENTURA COUNTY, CALIFORNIA

prepared by

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1.0 INTRODUCTION

Research Natural Areas (RNAs) are ecological or natural resource areas established on National Forest System lands as part of a continuing land and resource management planning process, and are set aside in perpetuity for research and education and/or to maintain biodiversity. In addition to being used for non-manipulative research, observation, and study, RNAs may implement provisions of laws such as the Endangered Species Act and the monitoring provisions of the National Forest Management Act.

Other general objectives of establishing RNAs, in addition to the broader ones identified above, include preserving, protecting, and maintaining special or unique natural habitats, ecotypes, and genetic diversity, protecting the areas against environmental or human disturbances, setting aside long-term controls or study sites for observing succession of communities and ecological change, and providing areas to monitor effects of natural resource management techniques and practices. Detailed descriptions of RNAs and policies governing them are provided in Section 4063 of the Forest Service Manual.

The Sawmill Mountain Candidate Research Natural Area (CRNA) is located in the Mt. Pinos Ranger District of the Los Padres National Forest, California. The area was selected to represent primarily an example of the Jeffrey pine forest target vegetation type within the Transverse Ranges physiographic province in the Region 5 (Pacific Southwest Region) national RNA Program. On June 19, 1992, this region was included in the Chumash Wilderness established in the Los Padres National Forest (PL 102-301; Figure 1).

2.0 PHYSICAL DESCRIPTION OF THE CRNA

2.1 Physical Setting, Hydrology, and Climate

Sawmill Mountain lies in the Mt. Pinos region of the mountains of central and northern Ventura County, part of the Transverse Ranges of southern California. Mt. Pinos is located immediately to its east; to the northwest lies Cerro Noroeste (Mt. Abel), and to the west San Emigdio Mesa. The rugged slopes of

Sawmill Mountain drain north to San Emigdio and Cuddy creeks, and westward by way of Dry and Apache canyons, to the Cuyama River, and ultimately to the Santa Maria River into the ocean (Figure 1). To the south, Sawmill Mountain drains by Lockwood and Piru creeks into the Santa Clara River. The Mt. Pinos region is included in the South Coast Drainage Basin of California (U.S. Department of Commerce, 1964).

Average annual temperature ranges from 50-60°F (10-15°C) over the northern two-thirds of Ventura County, with a large annual range in temperature (Soil Conservation Service, 1970). The average dates of the first and last freeze in the year range from October to December and May, respectively. Snowfall in the northern half of Ventura County averages 5 inches (13 cm) or more a year; along the northern border near Mt. Pinos, it averages more than 20 inches (51 cm). Potential evapotranspiration is about 28 inches (71 cm) for the entire year in interior Ventura County, and about 20 inches (51 cm) for the growing season; the figures estimated for actual evapotranspiration are 7 inches (18 cm) and 3-5 inches (8-13 cm), respectively. Range grasses are estimated to dry out as early as the end of May in the northwestern corner of the county (San Emigdio Mesa region), and as late as early June in the mountains (Soil Conservation Service, 1970).

The yellow pine forest at lower elevations in California typically receives an average of 25-80 inches (64-203 cm) of rain, partly as snow, and has a growing season of 4-7 months with 90-210 frost-free days. The mean summer maximum temperatures range from 80-93°F (27-34°C), and the mean winter minimum temperatures from 22-34°F (-6-1°C). At higher elevations in the red fir forest, average precipitation varies from 35 to 65 inches (89-165 cm) with heavy winter snow. The growing season lasts from 3 to 4.5 months, with 40-70 frost-free days; mean summer maximum temperatures range between 73-85°F (23-29°C), mean winter minima from 16-26°F (-9--3°C; Munz and Keck, 1968). However, in southern California, the two vegetation types are restricted in area, and Munz (1974) does not distinguish different communities between 5000-9000 feet (1524-2743 m). He indicates that average precipitation in the southern California montane coniferous forest region ranges from 35-60 inches (89-152 cm), and the growing season lasts from 3-7 months. Snowfall occurs at higher elevations and is often heavy; summer thundershowers also occur.

Some data were available from the Climatic Summary of the United States (U.S. Department of Commerce, 1964) for climatic stations in the region. Regarding stations where the only equipment is a recording type rain gage, two stations near the CRNA had data available for total precipitation: Chuchupate Ranger Station (latitude 34°48'N, longitude 119°01'W, elevation 5260 ft or 1603 m) and Apache Camp Station (latitude 34°52'N, longitude 119°20'W, elevation 4965 ft or 1513 m). Data are reported here only for Chuchupate Ranger Station located at the base of the Mt. Pinos region mountains in Lockwood Valley, since Apache Camp Station is further away and located at a much lower elevation than the Sawmill Mountain CRNA (Figure 1). Mean annual total precipitation for the years 1951-1960 at Chuchupate Ranger Station was 11.07 inches (28.12 cm). Minimum rainfall was recorded in August and the maximum in January. Data based on a 22 year average (1941-1963) indicated that average annual rainfall was 12.5 inches (31.75 cm) at Chuchupate Ranger Station; major precipitation was received from December through March, with snow predominant in February and March (Vogl and Miller, 1968). Precipitation is obviously higher on the mountains than in the valley: seven-year mountain summit snow depth records maintained by the Forest Service report averages of 32.4 inches (82.30 cm) of snow on March 1 and 18.2 inches (46.23 cm) on April 1 (exact location and years of snow depth records not reported by Vogl and Miller, 1968).

2.2 Location and Access

The Sawmill Mountain CRNA is located approximately at 34°48' N latitude and 119°10' W longitude, in northern Ventura County and southern Kern County. It lies in parts of Sections 25 and 36, T 9 N, R 22 W; Sections 30 and 31, T 9 N, R 21 W; Sections 1, 2, 11, 12, 13, and 14, T 8 N, R 22 W; and Sections 7 and 18, T 8 N, R 21 W. The area is mapped on the Sawmill Mountain 7.5 minute Quadrangle (Figures 1 and 2). The CRNA encompasses about 3800 acres (1539 ha).

Sawmill Mountain is accessible from the east, northwest, and south, by paved and dirt or 4WD roads, and trails. From the east, the Mt. Pinos region can be reached from Interstate Highway 5, using the exit for Frazier Park/Lake of the Woods. From Santa Maria and Taft, the area can be reached using California State highways 166 and 33, respectively, taking Cerro Noroeste Road southeast from the Reyes Station junction,

and driving almost up to the summit of Mt. Abel, to the northwest of the CRNA (Figure 1). From the south, driving time to the summit of Mt. Pinos is about 3 hours from Santa Barbara, and the distance covered approximately 116 miles (186 km). From the Supervisor's Office of the Los Padres National Forest in Goleta, driving time would be 3.25 hours and the total distance about 125 miles (200 km).

To reach Sawmill Mountain CRNA using the southern route, drive south on U.S. Highway 101 from the Supervisor's Office about 22 miles (35 km) to the junction of State Highway 150, and follow that about 15 miles (24 km) to the junction of State Highway 33. Follow Highway 33 for about 38 miles (61 km) to the Lockwood Valley Road junction. Follow Lockwood Valley Road (County Route 090100) east for about 27 miles (43 km) to Lake of the Woods, past Chuchupate Ranger Station (Figure 1). Take a left turn on Cuddy Valley Road (continuation of County Route 090100) to the turnoff leading south to the Mt. Pinos campgrounds, County Route S349S, which is reached after about 5 miles (8 km). Follow this road about 8.5 miles (14 km) to a large paved parking lot, the Chula Vista Picnic Area. An unimproved dirt road, Forest Road 9N24, proceeds west 1.2 miles (2 km) after the parking lot to the summit of Mt. Pinos; the road is very rough in places, requiring the use of a 4WD vehicle in winter and spring. A locked gate is situated just above the parking lot at the entrance to this dirt road, and the gate is kept open permanently only in the summer season (early June through September).

Since Sawmill Mountain CRNA is part of the Chumash Wilderness, the CRNA can be reached from the summit of Mt. Pinos only by foot, following Forest Trail 21W03 for about 1.5 miles (2.4 km) to the summit (Figure 2). Forest Trail 21W03 traverses the highest ridges of the CRNA and continues west to the summit of Mt. Abel, intersecting with Forest Trail 22W02 west of the summit of Sawmill Mountain. Forest Trail 22W02 proceeds south about 4 miles (6.4 km) past Sheep Campground to the southern edge of the CRNA and Lilly Meadows Campground. The trail continues beyond the campground south along North Fork Lockwood Creek to Three Falls Boy Scout Camp on Boy Scout Road, off Lockwood Valley Road. Since sections of the route between the two campgrounds either belong to private landowners or are now part of the Chumash Wilderness area, this southern access into the CRNA from Lockwood Valley Road is not an easy route to take and also would involve several miles of hiking before reaching the CRNA.

Sections of the Forest Trails and the location of Sheep Campground appear to have been mismapped on the topographic quad; the actual trails followed, including a small side trail to the summit of Sawmill Mountain from Forest Trail 21W03, have been marked on Figure 2. No other trails exist within the relatively undisturbed CRNA.

2.3 Topography

The boundaries established for the CRNA generally follow topographic divides (Figure 2). Elevations within the CRNA range from 6250 feet (1905 m) in the northern part to above 8750 feet (2667 m) at the summit of Sawmill Mountain. Grouse Mountain, to the west of the summit, is included in the CRNA. Although many small peaks, high ridges, and rocky outcrops exist in the CRNA, it is mainly composed of steep slopes, narrow drainages, seeps and springs with meadows, and some drier, wider washes. The two main trails are the major access routes within the CRNA, since many slopes, particularly in the north, are so steep that they are not accessible safely without climbing equipment. Snowmelt, springs, and seeps provide much of the water present in most of the wetland areas surveyed in the CRNA.

2.4 Geology and Soils

Geologically, the Mt. Pinos region is bounded by the San Andreas Fault to the north, the Big Pine Fault to the south, and the Ozena Fault to the west (Norris and Webb, 1976). The Mt. Pinos mountains are composed of granitic intrusive igneous and metamorphic rocks of the Mesozoic Era (Jurassic Period) or older (?), dating back probably as far as the Precambrian (?) Era. The northernmost edge of the CRNA is composed of Precambrian (?) to Mesozoic Pelona schist (ps), which is mica (muscovite)-quartz-albite schist. The northern slopes of Sawmill Mountain and its summit are made up of similar-aged gneissic rocks, primarily banded biotite-quartz-feldspar gneiss with some granitic rocks (gn), and a vein of this material including additionally augen gneiss (agn) with large potassium/orthoclase-feldspar porph blasts probably of Precambrian age. A vein and small outcrop of mylonitic rocks (my; rock ground or sheared under high pressure and temperature) of the same age were mapped in the northern part of the CRNA, and comprise

gray mylonitized schist and gneiss. These metamorphic rocks are covered in places by Quaternary landslide rubble of Pleistocene or recent Holocene epochs (Qls). Gray-white granitic rocks (gr), Mesozoic or older (?), are present in most of the area south of the summit and in a small section in the north, and contain outcrops of gneiss (gn) and quartzite (qz). Geological units were field mapped by Tom Dibblee (Dibblee, 1971; 1993) and are depicted in Figure 3.

The granitic bedrock has decomposed in most areas to form slightly acidic soils, often covered with a thick litter of pine needles, but bedrock outcrops are evident on ridges, rises, and actively eroding sites (Vogl and Miller, 1968). Soils in the region were mapped in a third-order survey by the U.S. Forest Service (O'Hare and Hallock, 1987). The Sawmill Mountain CRNA soils belong to 5 units: the Hades-Ginser-Ola Families Association with two classes of slope steepness (map units 6 and 7), the Kilburn-Wrentham-Supan Families Association (unit 11), and the Los Gatos-Kilburn-Panamint Families Association with two classes of slope steepness (units 20 and 21). The soil units are mapped in Figure 3 and their characteristics described in Appendix A. The soils are composed of a range of textures, from rocky or very coarse gravel at the summit to finer-grained soil in washes, seeps, and drainages (Table 1).

2.5 Natural and Human Impacts and Land Use

No major fires in the region have been recorded since 1912. A small fire of about 0.5 acres (0.2 ha), probably fairly recent and not very severe or hot, was noticed during field visits in June 1992 at 7900 feet (2408 m) near location I (Table 1; Figure 2). Lightning strikes occur at higher elevations frequently in summer, and result in small fires. For Mt. Pinos, such fires and their effect on vegetation and tree species have been discussed in detail by Vogl and Miller (1968); they indicate that Jeffrey pines are fire-dependent. The moderately high, open tree crowns of these trees and their thick bark make them survive fires well, although younger trees with thinner bark are more susceptible to damage. White firs are generally less resistant than Jeffrey pines to fires, which may explain why Jeffrey pines sometimes form a successional forest after fires on moister slopes (Rich and Borchert, 1982).

Since the land in the CRNA is federally owned, no private mining occurs in the area, nor have mining claims been reported; all mineral rights, similarly, are owned by the U.S.A. (Vredenburgh, 1993). The mineral resource potential of roadless areas in the Los Padres National Forest was assessed by the U.S. Geological Survey and the U.S. Bureau of Mines in the 1980s, and summarized in a report by Frizzell, Smith, Kuizon, and Hale (1985). The Sawmill-Badlands Roadless Area No. 5134 is a large area encompassing 141 square miles, and probably includes (?) part of the Sawmill Mountain CRNA. The region has been mined for borates and gypsum in the past; clay outcrops exist but have not been mined. Gold and uranium were reported occurring sporadically; the 1991 Mineral Information Location System (MILS) data base reported a gold prospect northeast of the CRNA (Vredenburgh, 1993). In general, however, the potential for the presence of undiscovered mineral resources in the Sawmill-Badlands Roadless Area is low; oil and gas potential in the area also is very low. In the CRNA, there are no known active or pending oil and gas leases, or leases for any other substances such as phosphates (Vredenburgh, 1993).

No commercially important timber species occur on the CRNA; in any case, since the area belongs to the Chumash Wilderness, logging or timber activity is prohibited. Most of the Sawmill Mountain CRNA does not lie within any grazing allotment, although a very small part at the southeastern edge falls in the Lockwood Allotment, and a small western section south of the summit lies in the Apache Canyon Allotment. However, the steep and rugged slopes of the CRNA probably preclude grazing altogether.

Because of the steep terrain in the entire Sawmill Mountain CRNA, most recreational activities are restricted to the two main trails, and include hiking, observed frequently during field visits, primitive camping, bird watching, nature trips for plant or wildlife observation, and nordic skiing. Disruptive or large group recreational activities were not noticed. Sheep Campground, located southwest of the summit, is a primitive campground with some dispersed fire rings. Observation during field visits indicated that it was used actively in the summer by one or two groups of people at a time, but adverse impacts such as vandalism, resource degradation, or soil compaction or erosion were not observed. Camping at Lilly Meadows Campground just on the boundary of the CRNA is not expected to impact the area negatively. Hunting or target practice were not noticed during field visits; however, there was a great deal of mountain biking

activity. Although the mountain biking was observed primarily on the trails, it should be discouraged altogether because the CRNA is in a Wilderness area. Mt. Pinos is a popular nordic skiing area in the winter, attracting sometimes 10,000 visitors a day: the Forest Service may expand the Chula Vista Picnic Area parking lot in the future to accommodate more visitors. However, detrimental effects are not anticipated in the Sawmill Mountain CRNA, since most skiers stay off this mountain due to the presence of steep slopes.

No cultural resources survey has been completed for the Sawmill Mountain CRNA. Rock art sites exist in the vicinity, situated close to the center of the Chumash universe and the sacred mountain, Mt. Pinos. A survey is recommended in the CRNA because of the relatively high potential of discovering sacred archaeological sites, which should be protected from adverse impacts (McFarland, 1993).

3.0 ECOLOGICAL DESCRIPTION OF THE CRNA

3.1 Locations Surveyed

An initial visit was conducted on June 27, 1992, for a floristic and reconnaissance survey. All locations surveyed (A-Q) were off Forest Trail 21W03 from the summit of Mt. Pinos to Sawmill Mountain, and south on Forest Trail 22W02 through Sheep Campground to Lilly Meadows Campground. During a second trip on July 18, 1992, more locations were surveyed westward along the trail to Mt. Abel and at upper elevations off the trail near the summit of Sawmill Mountain (locations A-G, R-V; Table 1; Figure 2). Plant voucher specimens were collected at all locations A through V and site descriptions prepared for these locations (Table 1; Figure 2). A final visit was made on October 17, 1992, to collect quantitative vegetation data. Areas surveyed on this trip include locations A-G; sampling points were located in areas representative of the different major tree-dominated vegetation types mapped in the CRNA.

3.2 Plant Communities

The montane coniferous forests of southern California are made up of combined elements from two main California vegetation types (Munz, 1974): yellow pine forest, a community including white firs, where trees can range in height from 75-200 feet (23-61 m); and the red fir forest, including Jeffrey pines, where trees can be 100 ft (30 m) tall (Munz and Keck, 1968). Since the two main types are rarely found occurring separately in southern California, such characteristics as the height ranges specified above or associated species may not hold true in the Mt. Pinos region mountains.

The Sawmill Mountain CRNA contains five major plant communities, with the two dominant species (Jeffrey pine and white fir) of the three forest types changing frequency, abundance, and cover on different slopes, exposures, and elevations. The major vegetation types are mapped in Figure 4. Locations surveyed with overstory and understory species ranked by dominance, and communities and associations observed, are given in Table 1; a species list is provided in Table 2. The five communities as described by Holland (1986) are outlined in Appendix B, and were described further in Parikh and Capralis (1988) with reference to Mt. Pinos for elevations above 8500 feet (2591 m).

The CRNA target vegetation type, Jeffrey pine (*Pinus jeffreyi*) forest (Holland type 85100), is made up of a fairly homogenous, dense distribution of large trees (particularly large on slopes adjacent to drainages) with a varied understory at different locations (Table 1; Figure 4). This species dominates drier slopes and southern, eastern, and western exposures, which receive more sunlight. Heights of trees can range up to 40 m. White firs may occur rarely. Soils are generally finer than the denuded gravelly soils near the summit. Typical understory plants are sticky-leaved rabbitbrush (*Chrysothamnus viscidiflorus*), silky lupine (*Lupinus elatus*), squaw current (*Ribes cereum*), and Parish's snowberry (*Symphoricarpos parishii*). The understory can vary in density, and annual species do occur in the summer (Tables 1 and 2).

Fine and moist soils with a thick litter cover on steep and shady northern slopes are covered by white fir (*Abies concolor*) forest (Holland type 85320), with a lower, denser, and more closed crown cover than the

Jeffrey pine forest. Heights of trees range up to 30 m. The understory is not dense, generally, and is composed of species such as Mt. Pinos larkspur (*Delphinium parishii* ssp. *purpureum*), Douglas' wallflower (*Erysimum capitatum*), squaw current (*Ribes cereum*), and mountain violet (*Viola purpurea*). Other annual species occur in the summer (Tables 1 and 2).

Less steep northern slopes with eastern and western exposures are dominated by mixed Jeffrey pine/white fir forest (Holland type 85210) with one or the other species dominating locally, depending on soil moisture and exposure. The understory appears to be dominated by species from the Jeffrey pine forest type. Although limber pine (*Pinus flexilis*) occurs relatively frequently and with some abundance at Mt. Pinos on northern slopes (Parikh and Capralis, 1988), it was seen only occasionally at higher elevations in the Sawmill Mountain CRNA on gently-sloping, relatively open summit flats, outcrops, and ridges. It appears to be absent where overstory is dense, for example, on steep northern slopes. It could thus be called a rare component of the white fir forest, or the mixed Jeffrey pine/white fir forest at Sawmill Mountain.

Montane meadow vegetation (Holland type 45100) is found in washes, drainages, springs, seeps, and depressional areas or concave slopes in the Sawmill Mountain CRNA. The meadows vary in size depending on microtopography, and generally contain fine soils. Holland (1986) divides the montane meadows into two subtypes, wet and dry meadows (Holland types 45110 and 45120), with wet meadow soils saturated all year. These wetland habitats are covered with rushes (*Juncus* spp.), sedges (*Carex* spp.), and spikerushes (*Eleocharis* spp.). Creeks at lower elevations are edged with a plant association made up of mountain-mahogany (*Cercocarpus ledifolius*), lupine (*Lupinus latifolius*), and arroyo willow (*Salix lasiolepis*). Species occurring in the dry wetland habitats include horsetail (*Equisetum laevigatum*), Bigelow's sneezeweed (*Helenium bigelovii*), western iris (*Iris missouriensis*), and Nevada blue-eyed grass (*Sisyrinchium halophilum*). Wetland plants found in wet meadows, spring, and seep habitats include various species of monkey-flower (*Mimulus guttatus, M. moschatus, M. primuloides*) and Greene's cinquefoil (*Potentilla glandulosa* ssp. *reflexa*). The overstory in most wetland habitats was dominated by Jeffrey pines (Table 1).

At highest elevations near the summit of Sawmill Mountain, where overstory tree species are very sparse, low subalpine fellfield cushion vegetation (Holland type 91130) is found in gravelly or rocky soil on gently sloping, open flats. Species include locoweed (*Astragalus purshii* var. *tinctus*), mariposa-lily (*Calochortus invenustus*), buckwheat (*Eriogonum kennedyi*), and squirrel-tail grass (*Sitanion hystrix*), with scattered shrubby plants such as sticky-leaved rabbitbrush (*Chrysothamnus viscidiflorus*).

Most locations in the Sawmill Mountain CRNA have an understory made up of scattered elements of rabbitbrush scrub and montane chaparral (Parikh and Capralis, 1988; Thorne, 1976). Some species found that are included in these communities are rabbitbrush (*C. nauseosus* ssp. *mohavensis, C. viscidiflorus*), squaw current (*Ribes cereum*), buckwheats (*Eriogonum* spp.), silky lupine (*Lupinus elatus*), showy penstemon (*Penstemon speciosus*), paint-brush (*Castilleja applegatei*), white yarrow (*Achillea millefolium* var. *lanulosa*), golden yarrow (*Eriophyllum confertifolium*), and snow bush (*Ceanothus cordulatus*). At elevations below 8000 feet (2438 m), scattered canyon oaks (*Quercus chrysolepis*) begin to appear in the overstory of the Jeffrey pine forest, still accompanied by the above understory plants. The oaks increase in abundance with decreasing elevations, where occasional one-needle pinyon pines (*Pinus monophylla*) also are found. This forest vegetation type of Jeffrey pines mixed with oaks and pinyon pines is particularly prevalent below 7500 feet (2286 m), and is mapped with all other vegetation types in Figure 4.

In general, vegetation in most places in the Sawmill Mountain CRNA was observed to be healthy. At upper elevations, especially near summit flats, lightning strikes had often killed trees, so that only charred trunks or dead foliage remained. Mistletoe attacks on trees were not observed commonly.

Species nomenclature follows Abrams and Ferris (1940), Twisselmann (1967), Munz and Keck (1968), Munz (1974), and Smith (1976). Photographs taken at Sawmill Mountain of the locations surveyed with different plant communities and species are reproduced in Appendix C.

3.3 Flora

A species list of the plants observed at Sawmill Mountain CRNA is given in Table 2. Voucher specimens were collected for most species in Summer 1992 and are deposited at the Herbarium at the Santa Barbara Botanic Garden. Although overstory tree species are very limited, perennial species and shrubs occupy a relatively high cover in the understory and annual species are present in the summer, particularly in areas where tree densities are low. The flora is derived historically mainly from the Sierran Forest of the West American Element of the Arcto-Tertiary Geoflora (Munz and Keck, 1968; Munz, 1974). The pine belt in southern California is similar to the southern Sierra Nevada: many of the high-elevation/montane species with disjunct distributions have affinities to the Sierran flora (Munz, 1974). The species composition of the understory and woodland elements at lower elevations of the CRNA is interesting; many species are transitional between drier interior desert flora and montane flora from wetter, cooler regions. A flora was prepared for Mt. Pinos for elevations above 8500 feet (2591 m) by Parikh and Capralis (1988); a number of those species may occur in the Sawmill Mountain CRNA, some species representing range extensions.

3.4 Sensitive Species and Habitats

No federally- or state-listed threatened, rare, or endangered plant or animal species are known to occur or were sighted in the CRNA. However, the region is part of the endangered California condor (*Gymnogyps californianus*) breeding habitat. Four sensitive plant species were encountered in the Sawmill Mountain CRNA. General locations where they were found are given in Table 2; the locations are described further in Table 1 and mapped in Figure 2. Flax-like monardella (*Monardella linoides* ssp. *oblonga*) is on CNPS List 1B, is not state-listed, but is federally listed as C2 (Candidate 2). The plant species Mt. Pinos larkspur (*Delphinium parishii* ssp. *purpureum*), pine green gentian (*Frasera neglecta*) and silky lupine (*Lupinus elatus*) are all on CNPS List 4, but are not state-listed. The larkspur is federally-listed as C3c (Candidate 3), but the gentian and lupine are not federally-listed (Smith and Berg, 1988).

The montane meadows vegetation in wetland habitats, and the subalpine fellfield cushion vegetation at the summit are very restricted in area and occurrence in the CRNA, and also generally in southern California. They are composed of a number of unique species; these sensitive habitats should be protected.

3.5 Quantitative Vegetation Assessment

The point-centered quarter method (Barbour, Burk and Pitts, 1980), a distance/plotless method for sampling vegetation, was used to evaluate density of the two main tree species found in the Sawmill Mountain CRNA, white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*). Thirty random sampling points were located in the different forest vegetation types mapped in the Sawmill Mountain CRNA (Figure 4). The area around each point was divided into four quadrants. The nearest pine or fir in each quadrant was identified, its distance from the central point was measured in meters, its height was estimated in meters, and diameter at breast height (dbh) was measured in centimeters. Average basal area was calculated in square meters from the dbh data. Average distance for all trees taken together was computed. The following formulae were used to calculate the total density of trees per hectare (10000 m^2), ~~relative~~ density of species X, and basal cover or dominance of species X:

$$total\ density = \frac{10000}{(average\ distance)^2}$$

$$\text{~~relative~~ density of species } X = \frac{no.\ of\ trees\ of\ species\ X}{total\ no.\ of\ trees} \times total\ density\ for\ all\ trees$$

$$\text{basal cover/dominance of species } X = \text{~~relative~~ density of species } X \times average\ basal\ area\ of\ species\ X$$

Around each sampling point, the number of seedlings and saplings were tallied within an area of 50 m^2 for white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*).

Results from the vegetation sampling data are provided in Table 3. Dbh values varied from about 3-114 cm for white fir and 3-153 cm for Jeffrey pines, the averages being about 30 cm and 50 cm, respectively. Mean basal area was 0.14 m^2 for white fir and 0.31 m^2 for Jeffrey pine; estimated tree heights ranged from 2-20 m and 2-35 m for the two species, respectively. ~~Relative~~ Density of adult white firs was about 37 trees/ha and of Jeffrey pines 119 trees/ha; their basal cover/dominance values were 5.36 m^2/ha and 37.31 m^2/ha, respectively.

Seedling and sapling recruitment numbers were moderate to low. For white fir, 127 seedlings were counted in 10 of 30 plots (frequency 33.33 percent) and 17 saplings in 6 of 30 plots (20 percent). Only 7 Jeffrey pine seedlings were encountered in 5 of 30 plots (16.67 percent), but 18 saplings were found in 9 of 30 plots (30 percent).

The quantitative data confirm field observations about the dominance of adult Jeffrey pines over white firs in most of the Sawmill Mountain CRNA, and indicate its suitability for the Jeffrey pine forest target vegetation type in the RNA system. However, seedling numbers indicate that recent recruitment of Jeffrey pine was very poor compared to white fir, even though survival into the sapling age-class showed almost the same success rate for both species. Jeffrey pines are less tolerant of shade and of soils covered by heavy litter compared to white firs (Rich and Borchert, 1982); this may partly explain why more white fir seedlings were observed than Jeffrey pine, although generalizations from these data cannot be made.

4.0 RECOMMENDATIONS

4.1 Management and Human Impacts

Since Sawmill Mountain CRNA is now part of a Wilderness area, recreation should be restricted severely, and limited to hiking, primitive camping, nature trips, and nordic skiing on trails. Recreational activities which are not permitted in Wilderness Areas, for example, mountain biking, should be prohibited by the U.S. Forest Service through regular monitoring or patrolling, or with the aid of signs. Since Sheep and Lilly Meadows campgrounds are located near sensitive wetland habitat, care should be taken in using them;

all montane meadow habitats should be well-protected. Because of the steep terrain in the CRNA, it is likely that most off-trail habitats will remain undisturbed, although the subalpine fellfield cushion area at the summit is more accessible and could be damaged by activities such as mountain biking. Since it is a rare and restricted vegetation type like the montane meadows, it also should be preserved.

4.2 Boundary Considerations

The proposed boundaries of the Sawmill Mountain CRNA are felt to be adequate in representing and preserving the Jeffrey pine forest target vegetation type, which covers most of the enclosed area in the CRNA. Along with this old and pristine forest comprising many large trees, a number of other plant communities are included within the boundaries and would be preserved: white fir forest, mixed Jeffrey pine/white fir forest, montane meadows, and subalpine fellfield cushion vegetation.

4.3 Summary

Sawmill Mountain is part of the southern California montane coniferous forest; the CRNA represents a forest type previously absent from the national RNA network for Region 5. The target Jeffrey pine forest and other communities found in the CRNA are typical of those found in the Mt. Pinos region and other southern California mountains. Sawmill Mountain has a unique stepping-stone location in the Transverse Ranges, one of a series of high-elevation disjunct mountain communities lying between the Sierra Nevada and the mountainous zones of San Bernardino and San Diego counties further south. This location has resulted in remarkable distribution patterns of vegetation and component high-elevation plant species, with affinities to Sierran species. At lower elevations, the vegetation found is transitional to high montane coniferous forest and pinyon-oak-juniper woodland.

A number of unique physical and biological habitats and species occur in the CRNA: steep slopes underlain with ancient igneous and metamorphosed granitic rocks, massive outcrops and ridges, montane flats with broken rocks and gravelly granitic soils, narrow drainages, creeks with flowing water, springs and seeps

with meadows, and wide dry washes. These habitats are occupied by a floral assemblage composed of species often occurring outside their typical ranges. The Sawmill Mountain CRNA also is part of the Chumash Wilderness, and has a high cultural resource value potential, as indicated by its proximity to nearby sacred archaeological sites. All these factors contribute to its natural resource values and offer many opportunities for future research. It is highly recommended that this area should be preserved as an RNA.

5.0 BIBLIOGRAPHY

Abrams, L. and R.S. Ferris. 1940. *Illustrated Flora of the Pacific States.* Stanford University Press, Stanford, CA. 4 volumes.

Barbour, M.G., J.H. Burk and W.D. Pitts. 1980. *Terrestrial Plant Ecology.* The Benjamin/ Cummings Publishing Company, Inc., Menlo Park, CA. 604 p.

Barbour, M.G. and J. Major, Eds. 1988. *Terrestrial Vegetation of California.* California Native Plant Society, Sacramento, CA. 1030 p.

Borchert, M. and M. Hibberd. 1984. *Gradient Analysis of a North Slope Montane Forest in the Western Transverse Ranges of Southern California.* Madroño, 31(3): 129-139.

Dibblee, T.W. Jr. 1971. Ventucopa and San Emigdio 15' Quadrangles, scale 1:62,500 (Field Geological Maps). Open File Maps. U.S. Geological Survey.

Dibblee, T.W. Jr. 1993. Personal Communication between Tom Dibblee, Dibblee Geological Foundation, Santa Barbara, and Anuja Parikh.

Frizzell, V.A. Jr., D.B. Smith, L. Kuizon and W.N. Hale. 1985. *Mineral Resource Potential of the Roadless Areas and the Santa Lucia Wilderness in the Los Padres National Forest, Southwestern California.* Summary Report to Accompany Map MF-1655-B. U.S. Geological Survey.

Griffin, J.R. and W.B. Critchfield. 1972. *The Distribution of Forest Trees in California.* Research Report PSW-82/1972. U.S.D.A. Forest Service, Berkeley, California.

Hall, H.M. 1902. *A Botanical Survey of San Jacinto Mountain.* U.C. Publ. Botany 1:1-140.

Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California.* California Department of Fish and Game, Sacramento, CA. 156 p.

Johnston, I.M. 1919. *The Flora of the Pine Belt of the San Antonio Mountains of Southern California.* Plant World 22:71-90, 105-122.

Magney, D. 1988. *Habitat Survey for California Jewelflower (Caulanthus californicus (S. Watson) Payson) in the Los Padres National Forest.* Unpublished Report. U.S.D.A. Forest Service Supervisor's Office, Los Padres National Forest, Goleta, CA.

McFarland, J. 1993. Personal Communication between Janine McFarland, Cultural Resources Staff, U.S.D.A. Forest Service Supervisor's Office, Los Padres National Forest, Goleta, and Anuja Parikh.

Munz, P.A. 1974. *A Flora of Southern California.* University of California Press, Berkeley, CA. 1086 p.

Munz, P.A. and D.D. Keck. 1968. *A California Flora and Supplement.* University of California Press, Berkeley, CA. 1681+224 p.

Norris, R.M. and R.W. Webb. 1976. *Geology of California.* John Wiley & Sons, Inc., New York, NY. 365 p.

O'Hare, J.P. and B.G. Hallock. 1987. *Soil Survey of Los Padres National Forest Area, California.* U.S.D.A. Forest Service and Soil Conservation Service, in Cooperation with the Regents of the University of California (Agricultural Experiment Station). 294 p.

Parikh, A. and D. Capralis. 1988. *Plant Communities and Flora of the Proposed Botanical Preserve on Mt. Pinos, Ventura and Kern Counties, CA.* Unpublished Report. U.S.D.A. Forest Service Supervisor's Office, Los Padres National Forest, Goleta, CA.

Rich, K. and M. Borchert. 1982. *Ecological and Silvical Characteristics of Los Padres National Forest Trees.* Unpublished Report. U.S.D.A. Forest Service Supervisor's Office, Los Padres National Forest, Goleta, CA.

Smith, C.F. 1976. *A Flora of the Santa Barbara Region.* Santa Barbara Museum of Natural History, Santa Barbara, CA. 331 p.

Smith, C.F. 1992. Personal Communication between Clif Smith, Herbarium Associate, Santa Barbara Botanic Garden, Santa Barbara, and Anuja Parikh.

Smith, J.P. and K. Berg. 1988. *Inventory of Rare and Endangered Vascular Plants of California.* California Native Plant Society, Sacramento, CA. 168 p.

Soil Conservation Service. 1970. *Soil Survey, Ventura Area, California.* U.S.D.A. Soil Conservation Service, in Cooperation with University of California Agricultural Experiment Station.

Thorne, R.F. 1976. *The Vascular Plant Communities of California.* In "Symposium Proceedings, Plant Communities of Southern California," J. Latting (Ed.), Special Publication No. 2. California Native Plant Society, Sacramento, CA. p. 1-31.

Twisselmann, E.C. 1967. *A Flora of Kern County, California.* The University of San Francisco, San Francisco, CA. 395 p.

U.S. Department of Commerce. 1964. *Decennial Census of United States Climate-Climatic Summary of the United States-Supplement for 1951 Through 1960, Climatography of the United States No. 86-4, California.* Bulletin W, 1930 Edition. National Oceanic and Atmospheric Administration, Environmental Data Service, Washington, D.C.

Vogl, R. and B.C. Miller. 1968. *The Vegetational Composition of the South Slope of Mt. Pinos, California.* Madroño, 19(7): 225-234.

Vredenburgh, L. 1993. Personal Communication between Larry Vredenburgh, Geologist, Bureau of Land Management, Caliente Resource Area Office, Bakersfield, and Anuja Parikh.

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APPENDIX A

SOIL MAPPING UNIT CHARACTERISTICS, SAWMILL MOUNTAIN

Source: O'Hare and Hallock (1987)

6 - HADES - GINSER - OLA FAMILIES ASSOCIATION - 10 to 30 percent slopes

ELEVATION: 6100 to 8600 feet | ANNUAL PRECIPITATION: 16 to 25 inches

SOIL MAP UNIT COMPONENTS	Hades	Ginser	Ola
APPROXIMATE PROPORTION	30 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountain tops	Mountain tops	Mountain tops
SLOPE	10 to 30 percent	10 to 30 percent	10 to 30 percent
VEGETATION SERIES	Jeffrey pine, white fir, or sagebrush	White fir or Jeffrey pine	White fir or Jeffrey pine

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 19 inches: brown gravelly sandy loam: weak subangular blocky structure: slightly hard; 25 percent pebbles: pH 6.5	0 to 7 inches: dark grayish brown sandy loam; moderate subangular blocky structure; soft; 3 percent pebbles, 10 percent cobbles; pH 7.0	0 to 4 inches: dark grayish brown sandy loam; weak granular structure; soft; 5 percent pebbles; pH 5.5
Subsoil	19 to 60 inches: yellowish brown gravelly sandy clay loam; moderate subangular blocky structure; hard; 25 percent pebbles; pH 7.0	7 to 48 inches: light olive brown very stony sandy loam; moderate subangular blocky structure; slightly hard; 15 percent pebbles, 10 percent cobbles, 30 percent stones; pH 6.8	4 to 30 inches: brown coarse sandy loam; weak subangular blocky structure; soft; 5 percent pebbles; pH 6.0
Substratum		48 to 60 inches: yellowish brown very cobbly sandy loam; weak subangular blocky structure; slightly hard; 10 percent pebbles, 40 percent cobbles; pH 6.8	30 inches: hard granite

INCLUDED AREAS: Included in this unit are areas of soils similar to Ola family (6), soils similar to Hades family (6), and rock outcrop (13). Included areas make up about 20 percent of map unit area.

MAP UNIT | 6 |

A-2

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Hades	Ginser	Ola
EFFECTIVE ROOTING DEPTH	very deep	very deep	moderately deep
AVAILABLE WATER CAPACITY	moderate	low	moderate
WATER RETENTION CLASS	2	2	2
HYDROLOGIC SOIL GROUP	B	B	B
PERMEABILITY	moderate	moderately rapid	rapid
MAXIMUM EROSION HAZARD	moderate	moderate	moderate
EROSION FACTOR K	0.28	0.32	0.32
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	2ex	2ex	2Ex
SOIL MANAGEABILITY GROUP	II	II	II
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBS/AC)	2600	1800	1800
FOREST SURVEY SITE CLASS	6	6	6

REMARKS: This map unit is mostly stable. Some areas have up to 20 percent surface rock fragments. The bedrock is fractured at 4 to 12 inch intervals with very fine to medium roots within the cracks. There are inclusions of soils with timber site class of 5.

MAP UNIT | 6 |

7 - HADES - GINSER - OLA FAMILIES ASSOCIATION - 30 to 60 percent slopes

ELEVATION: 6100 to 8600 feet | ANNUAL PRECIPITATION: 16 to 25 inches

SOIL MAP UNIT COMPONENTS	Hades	Ginser	Ola
APPROXIMATE PROPORTION	30 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountainsides	Mountainsides	Mountainsides
SLOPE	10 to 30 percent	10 to 30 percent	10 to 30 percent
VEGETATION SERIES	Jeffrey pine, white fir, or sagebrush	White fir or Jeffrey pine	White fir or Jeffrey pine

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 19 inches; brown gravelly sandy loam; weak subangular blocky structure; slightly hard; 25 percent pebbles; pH 6.5	0 to 7 inches; dark grayish brown sandy loam; moderate subangular blocky structure; soft; 3 percent pebbles, 10 percent cobbles; pH 7.0	0 to 4 inches; dark grayish brown sandy loam; weak granular structure; soft; 5 percent pebbles; pH 5.5
Subsoil	19 to 60 inches; yellowish brown gravelly sandy clay loam; moderate subangular blocky structure; hard; 25 percent pebbles; pH 7.0	7 to 48 inches; light olive brown very stony sandy loam; moderate subangular blocky structure; slightly hard; 15 percent pebbles, 10 percent cobbles, 30 percent stones; pH 6.8	4 to 30 inches; brown coarse sandy loam; weak subangular blocky structure; soft; 5 percent pebbles; pH 6.0
Substratum		48 to 60 inches; yellowish brown very cobbly sandy loam; weak subangular blocky structure; slightly hard; 10 percent pebbles, 40 percent cobbles; pH 6.8	30 inches; hard granite

INCLUDED AREAS: Included in this unit are areas of Ola family (6), soils similar to Hades family (6), and rock outcrop (13). Included areas make up about 20 percent of map unit area.

7 - HADES - GINSER - OLA FAMILIES ASSOCIATION - 30 to 60 percent slopes

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Hades	Ginser	Ola
EFFECTIVE ROOTING DEPTH	very deep	very deep	moderately deep
AVAILABLE WATER CAPACITY	moderate	low	moderate
WATER RETENTION CLASS	2	2	2
HYDROLOGIC SOIL GROUP	B	B	B
PERMEABILITY	moderate	moderately rapid	rapid
MAXIMUM EROSION HAZARD	high	high	high
EROSION FACTOR K	0.28	0.32	0.32
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	3Ex	3Ex	3Ex
SOIL MANAGEABILITY GROUP	III	III	III
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBS/AC)	2600	1800	1800
FOREST SURVEY SITE CLASS	6	6	6

REMARKS: This map unit is stable with some rock slides. Some areas have up to 20 percent surface rock fragments. The bedrock is fractured at 4 to 12 inch intervals with few very fine to medium roots within the cracks. There are included soils with timber site class of 5.

ELEVATION: 5000 to 7800 feet

SOIL MAP UNIT COMPONENTS	Kilburn	Wrentham	Supan
APPROXIMATE PROPORTION	25 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountainsides	Mountainsides	Mountainsides
SLOPE	30 to 60 percent	30 to 60 percent	30 to 60 percent
VEGETATION SERIES	Jeffrey pine, mixed conifer, ceanothus, or pinyon pine	Jeffrey pine, mixed conifer, or pinyon pine	Jeffrey pine, scrub oak or pinyon pine

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 7 inches: grayish brown very cobbly sandy loam; moderate granular structure; soft; 15 percent pebbles, 25 percent cobbles; pH 5.1	0 to 3 inches: yellowish brown coarse sandy loam; weak granular structure soft; 4 percent pebbles; pH 6.3	0 to 2 inches: dark grayish brown sandy loam; weak subangular blocky structure; soft; 5 percent pebbles; pH 5.5
Subsoil	7 to 19 inches, light olive brown very gravelly loam; moderate subangular blocky structure; soft; 35 percent pebbles, 10 percent cobbles; pH 6.5	3 to 29 inches; brown very cobbly sandy loam; weak subangular blocky structure; soft; 8 percent pebbles, 40 percent cobbles; pH 6.3	2 to 30 inches: dark grayish brown sandy clay loam; moderate subangular blocky structure; slightly hard; 10 percent pebbles; pH 7.0
Substratum	19 to 36 inches; light yellowish brown extremely cobbly loam; weak subangular blocky structure soft; 50 percent pebbles, 30 percent cobbles, 30 percent stones; pH 6.5	29 to 34 inches; brown extremely cobbly sandy loam; weak subangular blocky structure; soft; 30 percent pebbles, 40 percent cobbles; pH 6.3	30 to 33 inches: fractured hard gneiss
	36 inches; fractured hard gneiss	34 inches; fractured weathered granite	

INCLUDED AREAS: Included in this unit are areas of soils similar to Kilburn soils similar to Supan (10), soils similar to Hambright (16), and rock outcrop (13). Included areas make up about 25 percent of map unit area.

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Kilburn	Wrentham	Supan
EFFECTIVE ROOTING DEPTH	moderately deep	moderately deep	moderately deep
AVAILABLE WATER CAPACITY	low	low	moderate
WATER RETENTION CLASS	2	2	1
HYDROLOGIC SOIL GROUP	B	B	B
PERMEABILITY	moderately rapid	moderately rapid	moderate
MAXIMUM EROSION HAZARD	high	high	high
EROSION FACTOR K	0.20	0.24	0.28
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	3Cpx	3Cpx	3c
SOIL MANAGEABILITY GROUP	III	III	III
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBS/AC)	1200	1800	1800
FOREST SURVEY SITE CLASS	6	6	6

REMARKS: This map unit is mostly stable with some rock slides. Some areas have up to 20 percent surface rock fragments. The bedrock is moderately fractured at 6 to 12 inch intervals with few medium roots within the cracks. There is some inclusion of soils with moderate timber site class of 5.

ELEVATION: 5200 to 7500 feet | ANNUAL PRECIPITATION: 18 to 22 inches

SOIL MAP UNIT COMPONENTS	Los Gatos	Kilburn	Panamint
APPROXIMATE PROPORTION	25 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountainsides	Mountainsides	Mountainsides mostly south and west aspects
SLOPE	10 to 30 percent	10 to 30 percent	10 to 30 percent
VEGETATION SERIES	Jeffrey pine or pinyon pine	Jeffrey pine, pinyon pine, or scrub oak	Annual bromegrass, wild oats, Jeffrey pine, or scrub oak

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 3 inches; brown sandy loam; weak subangular blocky structure; soft; 3 percent pebbles; pH 6.4	0 to 7 inches; grayish brown very cobbly sandy loam; moderate granular structure; soft; 15 percent pebbles and 25 percent cobbles; pH 5.7	0 to 15 inches; brown coarse sandy loam; weak subangular blocky blocky structure; soft; 10 percent pebbles; pH 6.5
Subsoil	3 to 21 inches; brown sandy clay loam; moderate subangular blocky structure; hard; 8 percent pebbles; pH 6.6	7 to 19 inches; light olive brown very gravelly loam; moderate subangular blocky structure; soft; 35 percent pebbles and 10 percent cobbles; pH 6.2	15 to 39 inches; yellish brown coarse sandy loam; moderate subangular blocky structure; soft; 10 percent pebbles; pH 6.5
Substratum	21 inches; hard fractured gneiss	19 to 36 inches; light yellowish brown extremely cobbly sandy loam; weak subangular blocky structure; soft; 50 percent pebbles, 30 percent cobbles and 3 percent stones; pH 6.5 36 inches; hard fractured gneiss	39 inches; hard granitic rock

INCLUDED AREAS: Included in this unit are areas of Morical family (35), rock outcrop (13) and similar to Kilburn family (20), and soils similar to Los Gatos family (10). Included areas make up about 25 percent of map unit area.

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Los Gatos	Kilburn	Panamint
EFFECTIVE ROOTING DEPTH	moderately deep	moderately deep	Moderately deep
AVAILABLE WATER CAPACITY	low to moderate	low to moderate	moderate
WATER RETENTION CLASS	1	2	2
HYDROLOGIC SOIL GROUP	C	B	B
PERMEABILITY	moderate	moderately rapid	moderately rapid
MAXIMUM EROSION HAZARD	moderate	moderate	high
EROSION FACTOR K	0.28	0.24	0.24
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	2e	2ep	2E
SOIL MANAGEABILITY GROUP	II	II	II
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBS/AC)	2500	1500	1800
FOREST SURVEY SITE CLASS	6	6	6

REMARKS: This map unit is mostly stable. Some areas have up to 10 percent surface rock fragments. The bedrock is none to moderately fractured at 0 to 3 inch intervals with few fine roots in the cracks. Some inclusion soils have timber site class 5.

21 - LOS GATOS - KILBURN - PANAMINT FAMILIES ASSOCIATION - 30 to 60 percent slopes

ELEVATION: 5200 to 7500 feet | ANNUAL PRECIPITATION: 18 to 22 inches

SOIL MAP UNIT COMPONENTS	Los Gatos	Kilburn	Panamint
APPROXIMATE PROPORTION	25 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountainsides	Mountainsides	Mountainsides, mostly south and west aspects
SLOPE	30 to 60 percent	30 to 60 percent	30 to 60 percent
VEGETATION SERIES	Jeffrey pine or pinyon pine	Jeffrey pine, scrub oak, or pinyon pine	Annual brome grass, wild oats, Jeffrey pine, or scrub oak

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 3 inches: brown sandy loam; weak subangular blocky structure; soft; 3 percent pebbles; pH 6.8	0 to 17 inches: grayish brown very cobbly sandy loam; moderate granular structure; soft; 15 percent pebbles and 25 percent cobbles; pH 5.7	0 to 15 inches: brown coarse sandy loam; weak subangular blocky structure; soft 10 percent pebbles; pH 6.5
Subsoil	3 to 21 inches: brown sandy clay loam; moderate subangular blocky structure; hard; 8 percent pebbles; pH 6.6	7 to 19 inches: light olive brown very gravelly loam; moderate subangular blocky structure; soft; 35 percent pebbles and 10 percent cobbles pH 6.2	15 ot 39 inches: yellowish brown coarse sandy loam; moderate subangular blocky structure, soft; 10 percent pebbles pH 6.5
Substratum	21 inches: hard fractured gneiss	19 to 36 inches: light yellowish brown extremely cobbly sandy loam; weak subangular blocky structure; soft; 50 percent pebbles 30 percent cobbles and 3 stones, pH 6.5 36 inches: hard fractured gneiss	39 inches: hard granitic rock

INCLUDED AREAS: Included in this unit are areas of Morical family (35), Supan family (13), soils similar to Kilburn family (37), and soils similar to Los Gatos family (10) Included areas make up about 25 percent of map unit area.

MAP UNIT | 21 |

A-6

21 - LOS GATOS - KILBURN - PANAMINT FAMILIES ASSOCIATION - 30 to 60 percent slopes

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Los Gatos	Kilburn	Panamint
EFFECTIVE ROOTING DEPTH	moderately deep	moderately deep	moderately deep
AVAILABLE WATER CAPACITY	low to moderate	low to moderate	moderate
WATER RETENTION CLASS	1	2	2
HYDROLOGIC SOIL GROUP	C	B	B
PERMEABILITY	moderate	moderately rapid	moderately rapid
MAXIMUM EROSION HAZARD	high	high	very high
EROSION FACTOR K	0.28	0.28	0.28
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	3E	3E	3E
SOIL MANAGEABILITY GROUP	III	III	III
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBS/AC)	2500	1500	1800
FOREST SURVEY SITE CLASS	6	6	6

REMARKS: This map unit has some rock slides. Some areas have up to 15 percent surface rock fragments. The bedrock is fractured at 0 to 3 inch intervals with few fine roots within the cracks. Some inclusion soils have timber site classes of 5.

MAP UNIT | 21 |

APPENDIX B

HOLLAND VEGETATION TYPES FOUND AT SAWMILL MOUNTAIN

Source: Holland (1986)

ELEMENT NAME: Jeffrey Pine Forest
ELEMENT CODE: 85100

DESCRIPTION:
A tall, open forest dominated by Pinus Jeffreyi, with sparse understories of species drawn from Montane Chaparral (37500) or Sagescrub Scrub (35200). Very similar in aspect to Ponderosa Pine Forest (84210, 84220). Pure stands are best developed on desert-facing slopes.

SITE FACTORS:
Dry, cold sites, especially on well-drained slopes, ridges, or cold air accumulation basins. West of the Sierran crest, it intergrades at its lower elevational limit (5000-6500 ft) with Montane Chaparral (37500), Coulter Pine Forest (84140) or Westside Ponderosa Pine Forest (84210). East of the crest it passes to Piñon-Juniper Woodlands (72000), Great Basin Scrub (35000) or Eastside Ponderosa Pine Forest (84220). Passes in more mesic sites or higher elevations (7000-9000 ft) into Upper Montane Mixed Conifer Forest (85200) or Subalpine Forest (86000).

CHARACTERISTIC SPECIES:
Artemisia tridentata, Chrysolepsis sempervirens, Pinus Jeffreyi, Purshia tridentata, Quercus vaccinifolia, Symphoricarpus Parishii, Ceanothus prostratus, C. velutinus, C. cordulatus, Arctostaphylos patula, Cercocarpus ledifolius, Arctostaphylos nevadensis

DISTRIBUTION:
Similar to Sierran Mixed Conifer Forest (84230) but typically at higher elevation and more extensive toward the south and east. Scattered through the higher North Coast Ranges and Klamath Mtns. Abundant from Shasta and Lassen Cos. southward through the Sierra Nevada to Kern Co. Best developed on the east side of the central Sierra Nevada, especially south of Mono Lake. Relatively abundant in the higher portions of the Transverse and Peninsular Ranges of southern California and Baja California, including the Mt. Pinos region, the eastern San Gabriel Mtns., San Bernardino Mtns., San Jacinto Mtns., Cuyamaca-Laguna Mtns., and the Sierra San Pedro Martir. Elevation usually 5500-7500 ft (1650-2700 m) in the north and 6500-9000 ft (2000-2700 m) in the south. Stands at lower elevations probably are on ultramafic substrates.

SOURCES: 1, 11, 45

ELEMENT NAME: Jeffrey Pine-Fir Forest
ELEMENT CODE: 85210

DESCRIPTION:
Very similar to Sierran Mixed Conifer Forest (84230), but not quite so tall (to 60 m). The understory is open, primarily of scattered Montane Chaparral (37500) and small trees, lacking the mesophytic components of the Sierran Mixed Conifer Forest. Growth is most active in early and midsummer, about the same as in Jeffrey Pine Forest (85100) and a little later than in Sierran Mixed Conifer Forest.

SITE FACTORS:
Similar to and probably the high-elevation equivalent of Sierran Mixed Conifer Forest (84230). Similar to Jeffrey Pine Forest (85100) but moister. On well-drained slopes, usually avoiding the driest and moistest sites. Typically occurs above Sierran Mixed Conifer Forest and intergrades broadly with Jeffrey Pine Forest on dry slopes and ridges, with Upper Montane Fir Forest (85300) on moist, north-facing slopes and with Lodgepole Pine Forest (86100) in cold, wet sites and stream valleys. Replaced at its upper limit by Subalpine Coniferous Forest (86000), usually Lodgepole Pine Forest.

CHARACTERISTIC SPECIES:
Abies concolor (mostly in southern California), A. magnifica (lacking in southern California), Ceanothus cordulatus, Chrysolepis sempervirens, Pinus Jeffreyi, P. monticola (lacking in southern California), P. Murrayana, Quercus vaccinifolia

DISTRIBUTION:
Abundant from Mt. Lassen southward along the west side of the Sierra Nevada to Tulare Co. More scattered on the east side of the Sierra Nevada from Lake Tahoe to the Mt. Whitney region and in the higher portions of the North Coast Ranges and Klamath Mtns. Occurs with fewer trees species in the southern Sierra Nevada in Kern Co., and the higher portions of the Tehachapi Mtns., the Mt. Pinos region, the eastern San Gabriel Mtns., San Bernardino Mtns. and San Jacinto Mtns. Elevation usually 6000-8000 ft (1800-2420 m) in the north and 7000-9000 ft (2100-2700 m) in the south.

ELEMENT NAME: Southern California White Fir Forest
ELEMENT CODE: 85320

DESCRIPTION:
Very similar to Sierran White Fir Forest (84240) and Red Fir Forest (85310) but not so tall or dense. Typically consists of nearly pure stands of Abies concolor which grows to about 30 m tall. The southern Californian stands of this species, especially the Mojave Desert disjuncts, show some affinity to the Rocky Mountain form (Griffen and Critchfield 1972). The understory is sparse, with scattered Montane Chaparral shrubs (37500) in the openings and with moderate accumulation of needle litter and downed branches. Growth is most active from early to midsummer, probably limited by drought in late summer and by low temperature.

SITE FACTORS:
Similar to Sierran White Fir Forest (84240), but higher, colder and probably drier. Similar to Red Fir Forest (85310) and probably its southern equivalent, but drier. Usually confined to steep, north-facing slopes where snow lingers until late spring. The soil is usually rocky and well drained. Intergrades at its lower elevational limit or on drier sites with Jeffrey Pine-Fir Forest (85210). Replaced at its upper limit by Lodgepole Pine Forest (86100).

CHARACTERISTIC SPECIES:
Abies concolor, Chrysolepis sempervirens, Pinus lambertiana, Ribes spp., Sarcodes sanguinea, Symphoricarpos spp.

DISTRIBUTION:
Scattered in the southern Sierra Nevada and the highest parts of the Tehachapi Mtns., Kern Co; on Mt. Pinos, Ventura-Kern Co. line; common in the higher portions of the eastern San Gabriel Mtns., Los Angeles-San Bernardino Cos.; the San Bernardino Mtns., San Bernardino Co. and the San Jacinto-Santa Rosa Mtns., Riverside Co. Elevation usually 7500-9500 ft (2300-2880 m).

SOURCES: 1, 6, 11, 44

ELEMENT NAME: Montane Meadow ELEMENT CODE: 45100

DESCRIPTION: Dense growth of sedges and other perennial herbs, usually from 0.5-1 m high, but with some taller herbs to 2 m. Main growth period from late spring through summer (summer only at higher elevations); flowering mostly in summer; dormant in winter (from fall through spring at higher elevations). Montane Meadows are subdivided into Wet (45110) and Dry (45120) subtypes. Wet Montane Meadows have soils that remain saturated throughout the year.

SITE FACTORS: On fine-textured, more or less permanently moist or wet soils. May be associated with Bogs (51100), Fens (51200) or Freshwater Swamps (52600) in more extremely waterlogged soils. Adjacent forest or scrub are on coarser, better drained soils. Often a successional stage in the filling of lakebeds with soil, and characterized by young trees encroaching from the margins. On seasonally drier, but still fine-textured soils may intergrade with Coastal Prairie (41000) in the North Coast Ranges, Valley and Foothill Grasslands (42000) in the Sierra Nevada foothills, and Great Basin Grassland (43100) or Great Basin Sagebrush (35200) in northeastern California. Both Wet and Dry types may occur in a given meadow.

CHARACTERISTIC SPECIES: Camassia guamash, Carex bolanderi, C. rostrata, C. vesicaria, Dodecatheon jeffreyi, Glyceria elata, Eleocharis acicularis bella, Heracleum sphondylium ssp. montanum, Juncus nevadensis, Lupinus polyphyllus ssp. superbus, Muhlenbergia filiformis, Pteridium aquilinum, Scirpus congdonii, S. criniger, Veratrum californicum, V. fimbriatum (in North Coast Ranges). Ratliff (195, 196) discusses several distinctions between Wet and Dry types.

DISTRIBUTION: Scattered within the North Coast Coniferous Forests (82000), Lower Montane Forests (84000), and Upper Montane Forests (85000) of the North Coast Ranges, Klamath Ranges, Cascade Range, Sierra Nevada, Transverse and Peninsular ranges. Elevation from 1000-7000 ft. (300-2130 m) in the north to 5000-9000 ft. (1520-2740 m) in the south.

SOURCES: 1, 13, 48, 150, 174, 190, 195, 196

ELEMENT NAME: Southern California Fell-Field
ELEMENT CODE: 91130

DESCRIPTION:
Very similar to Sierra Nevada Fell-Fields (91120), but generally more sparsely vegetated and with a higher proportion of xerophytic "cushion plants." The growing season often begins in June, earlier than in the Sierra Nevada Fell-Fields. Flowering occurs mostly in July.

SITE FACTORS:
Very similar to Sierra Nevada Fell-Fields (91120), but probably drier with less accumulation of snow and not quite so cold. Subject to very severe winds from fall through spring which are probably the cause of the lowered treeline on these peaks. Occurs above Southern California Subalpine Forest (86500), or Alpine Talus and Scree Slopes (91200), sometimes intergrading with the latter.

CHARACTERISTIC SPECIES:
Draba corrugata, Eriogonum Kennedyi var. alpigenum, Pauchera Parishii, Holodiscus microphyllus, Raillardella argentea, Ranunculus eschscholtzii

DISTRIBUTION:
Summit region of Mt. San Gorgonio and adjoining ridges in the San Barnardino Mtns., San Bernardino Co., mostly above 11000 ft (3330 m). Sparingly developed on the summit of San Antonio Mtn., San Gabriel Mtns., Los Angeles-San Bernardino Co. at 10000 ft (3030 m) and on the summit of Mt. San Jacinto, San Jacinto Mtns., Riverside Co. at 10800 ft (3270 m).

SOURCES: 1, 56

APPENDIX C

PHOTOGRAPHS TAKEN AT SAWMILL MOUNTAIN

Photo 1. Sawmill Mountain CRNA, View From Mt. Pinos.

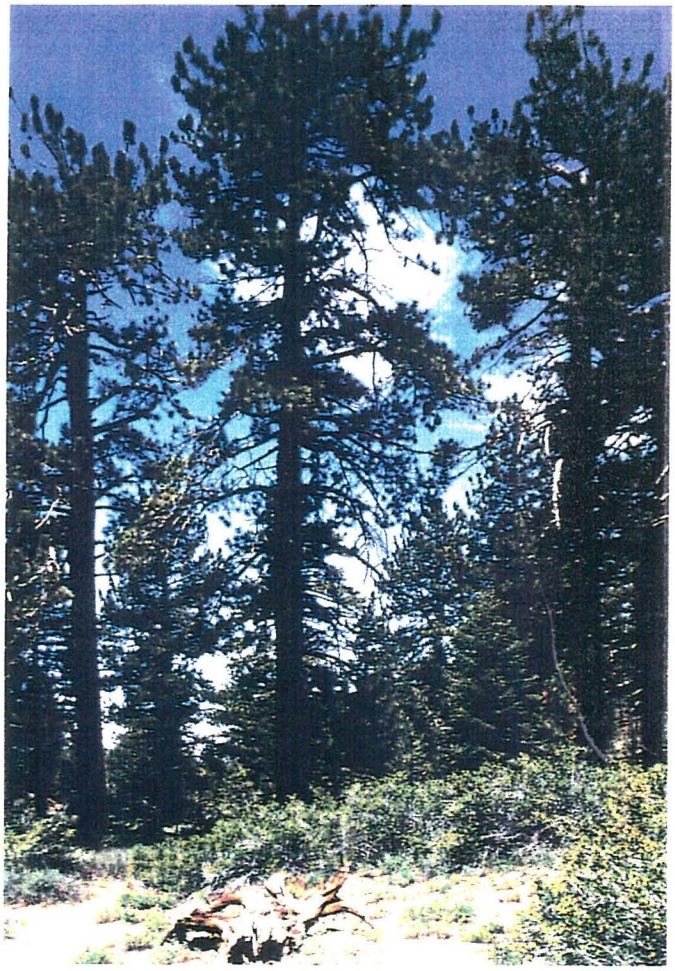

Photo 2. Jeffrey Pine (*Pinus jeffreyi*) Forest With an Understory Dominated by Squaw Current (*Ribes cereum*), Location F.

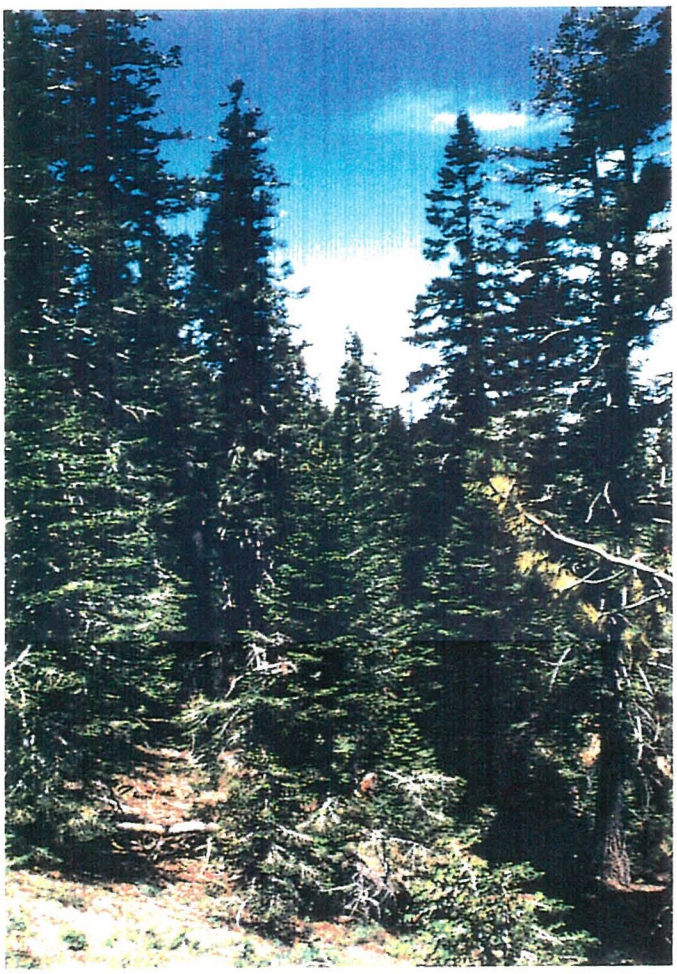

Photo 3. Jeffrey Pine (*Pinus jeffreyi*)/
White Fir (*Abies concolor*) Forest, Location A.

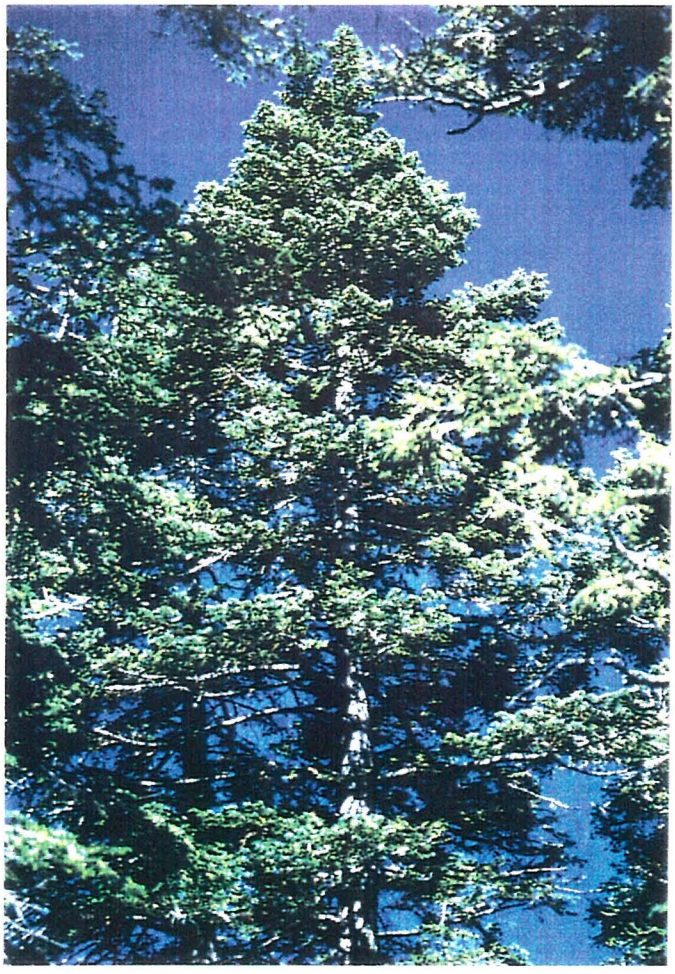

Photo 4. White Fir (*Abies concolor*) Forest, Location V.

Photo 5. Flats Approaching the Summit With Sparse Jeffrey Pine (*Pinus jeffreyi*) Forest and Elements of Rabbitbrush Scrub, Between Locations D and E.

Photo 6. View of the Steep Forested Northern Slopes and Flats Around the Summit With Subalpine Fellfield Cushion Vegetation and Elements of Rabbitbrush Scrub, Location E.

Photo 7. View South From the Summit Area With Subalpine Fellfield Cushion Vegetation, Elements of Rabbitbrush Scrub and Montane Chaparral, and Jeffrey Pine (*Pinus jeffreyi*) Forest, Near Location E.

Photo 8. Wet and Dry Montane Meadows in an Area With Springs and Seeps, With an Overstory of Sparse Jeffrey Pines (*Pinus jeffreyi*), North of Sheep Campground, Location G.

Photo 9. Open Jeffrey Pine (*Pinus jeffreyi*) Forest With Scattered Canyon Oak (*Quercus chrysolepis*), With Elements of Rabbitbrush Scrub and Subalpine Fellfield Cushion Vegetation, Location K.

Photo 10. Open Mature Jeffrey Pine (*Pinus jeffreyi*) Forest With Scattered Canyon Oak (*Quercus chrysolepis*), Rare Pinyon Pine (*Pinus monophylla*), and Mixed Understory Elements, Location Q.

Photo 11. Flax-like monardella (*Monardella linoides* ssp. *oblonga*), CNPS List: 1B, State/Federal Status: -/C2.

Photo 12. Mt. Pinos larkspur (*Delphinium parishii* ssp. *purpureum*), CNPS List: 4, State/Federal Status: -/C3c.

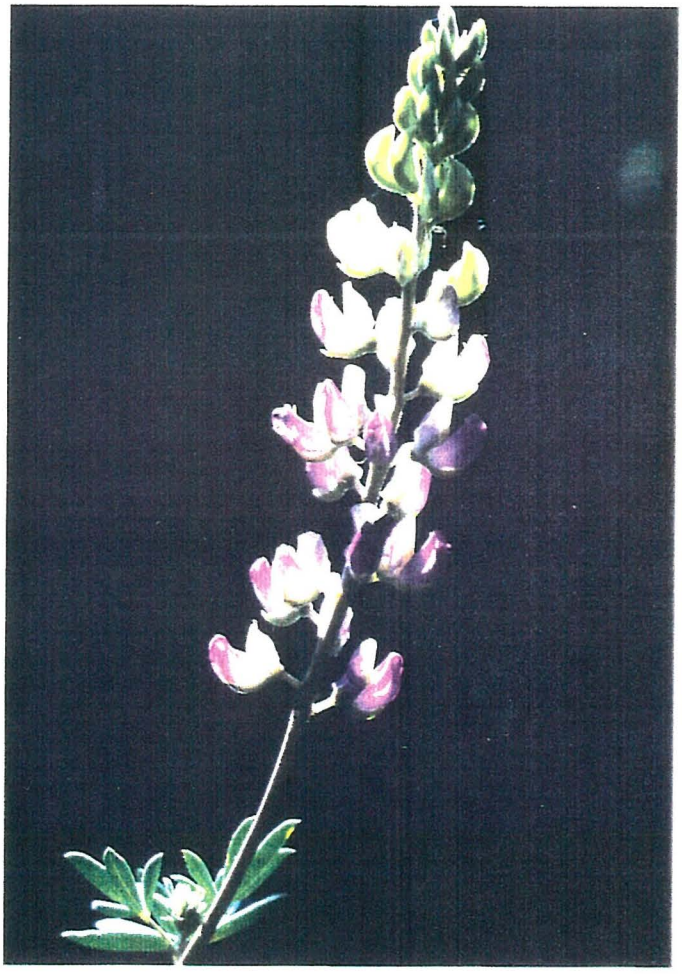

Photo 13. Silky lupine (*Lupinus elatus*), CNPS List: 4, State/Federal Status: none.

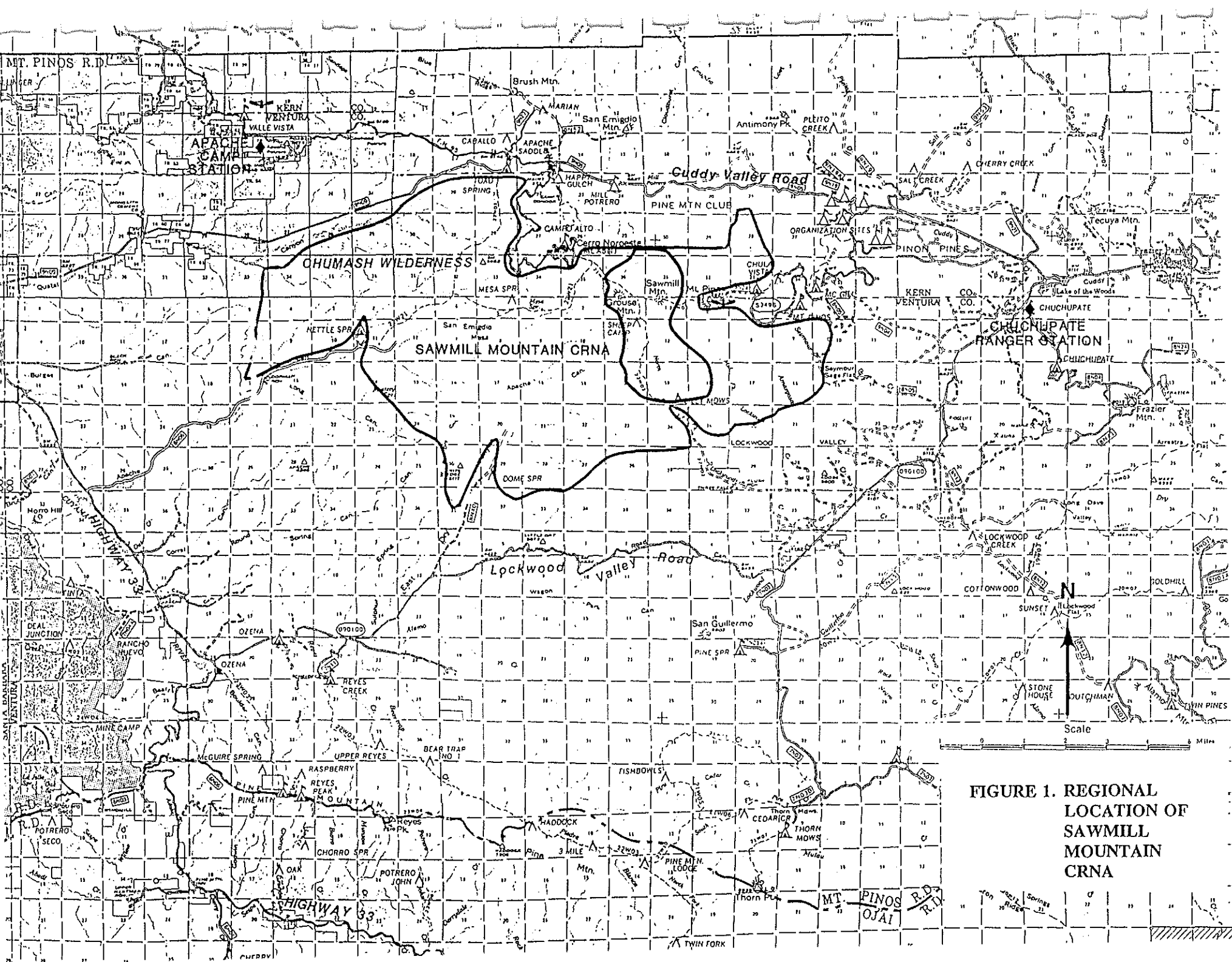

FIGURE 1. REGIONAL LOCATION OF SAWMILL MOUNTAIN CRNA

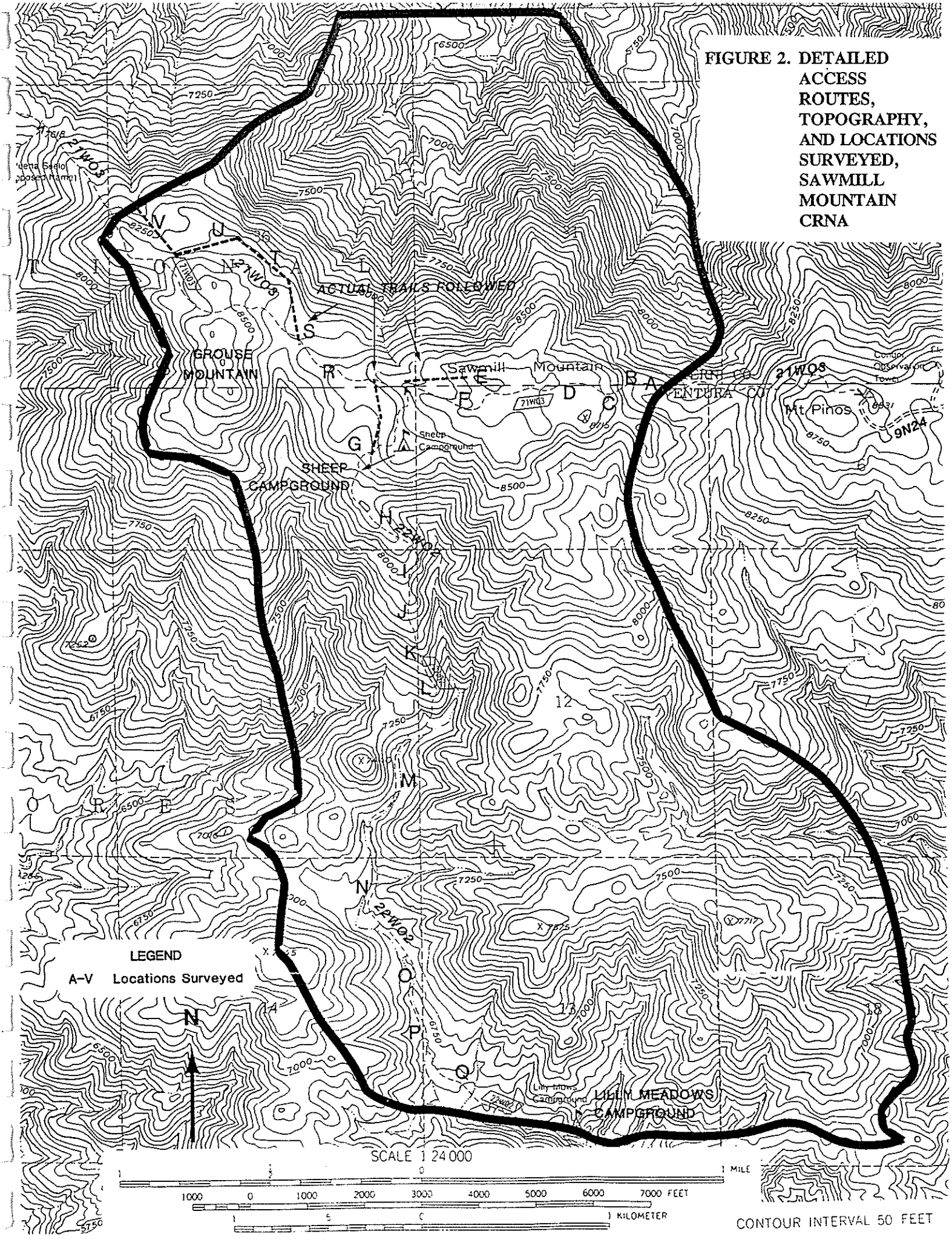

FIGURE 2. DETAILED ACCESS ROUTES, TOPOGRAPHY, AND LOCATIONS SURVEYED, SAWMILL MOUNTAIN CRNA

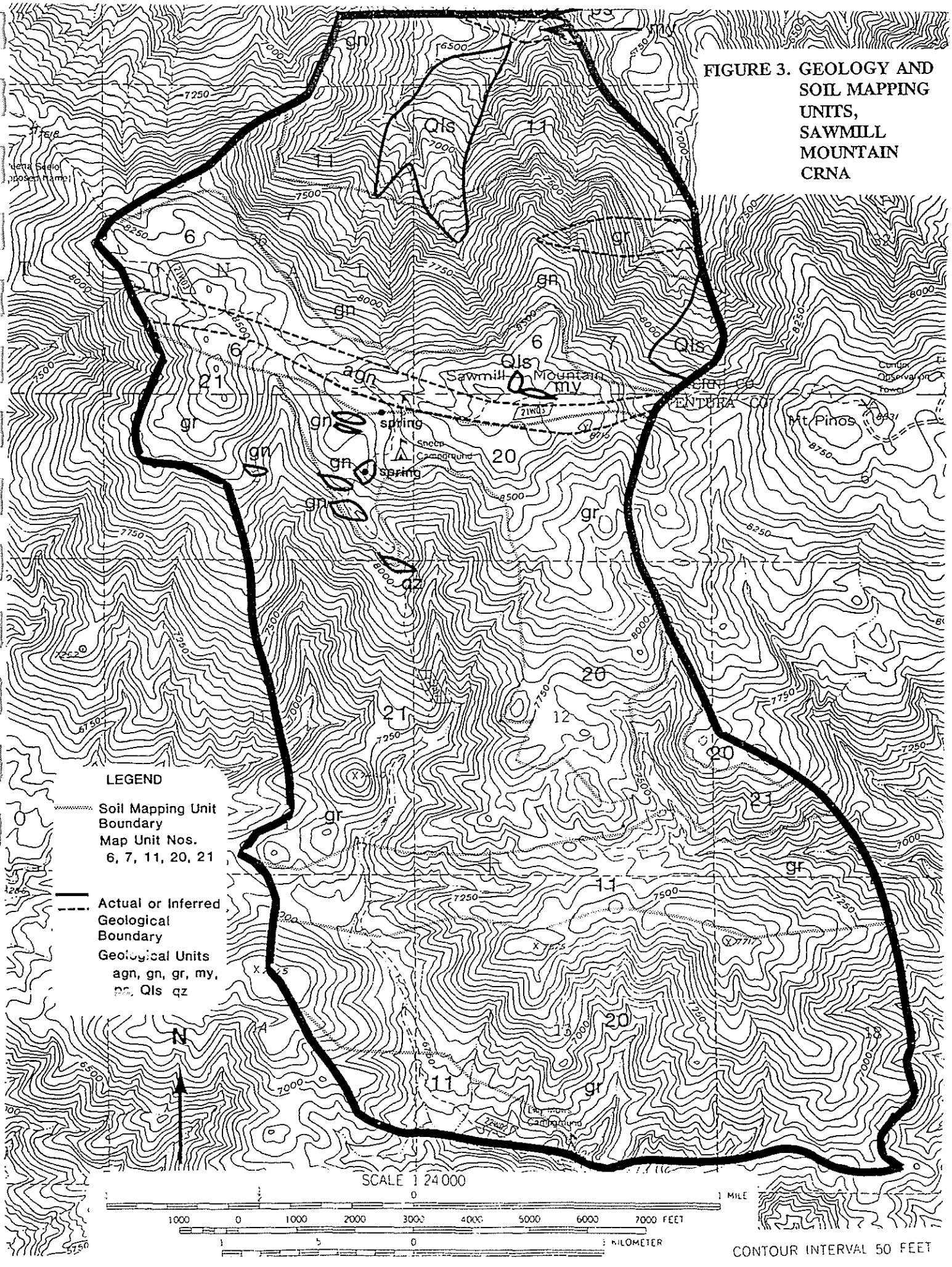

FIGURE 3. GEOLOGY AND SOIL MAPPING UNITS, SAWMILL MOUNTAIN CRNA

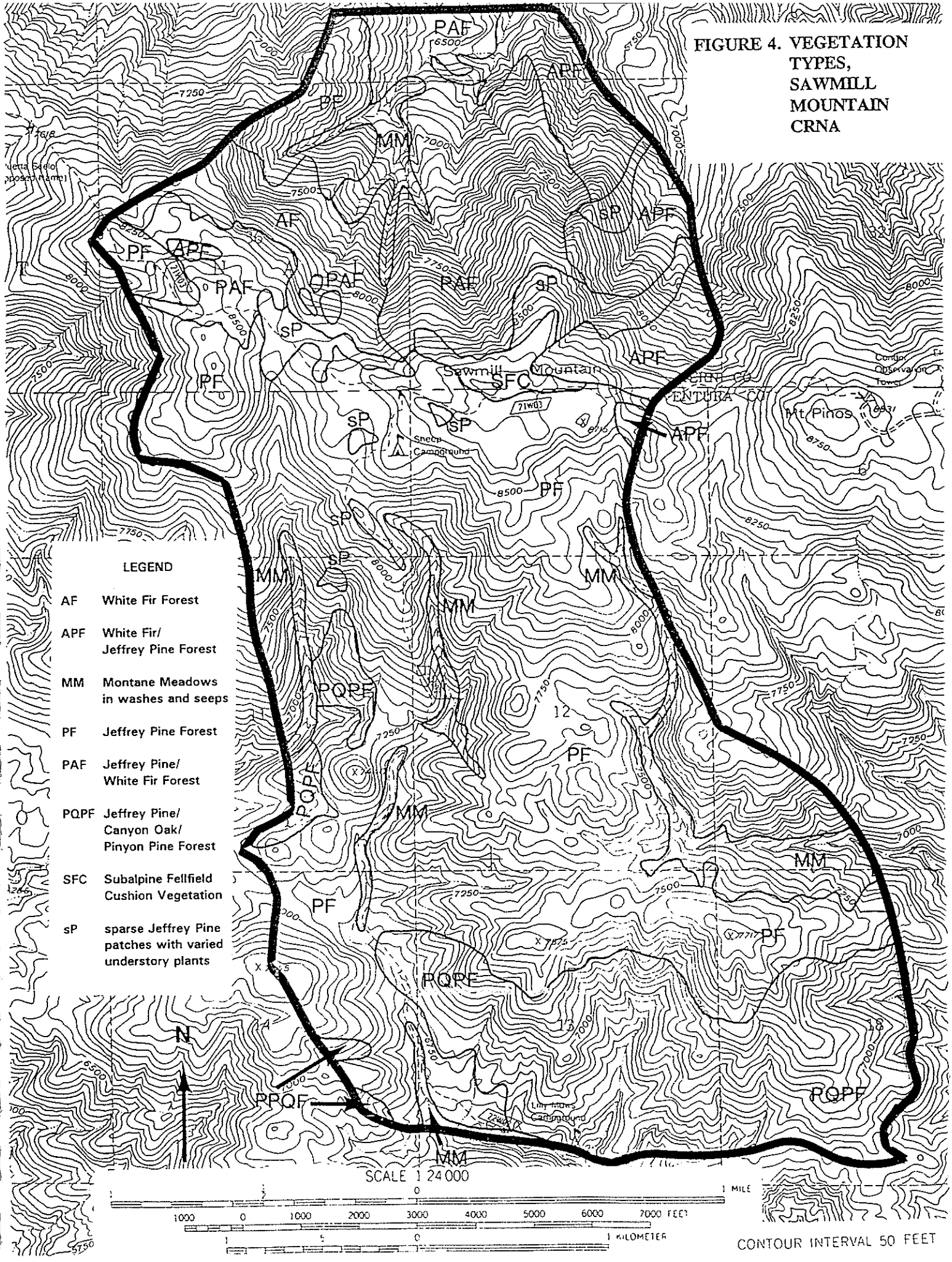

FIGURE 4. VEGETATION TYPES, SAWMILL MOUNTAIN CRNA

Table 1. Locations Surveyed with Dates, Sawmill Mountain CRNA
(pg 1 of 3)

Location Date	Physical Characteristics	Overstory and Understory Species Ranked by Dominance Plant Communities and Associations Observed *
A 6/27/92 7/18/92	Saddle between Mt. Pinos and Sawmill Mt. Coarse soil Elevation 8400 ft Flat, steep slopes either side 10-15°	*Pinus jeffreyi; Abies concolor; Symphoricarpos parishii; Chrysothamnus viscidiflorus; Ribes cereum; Castilleja applegatei; Delphinium parishii ssp. purpureum; Carex douglasii; Allium fimbriatum; Calochortus invenustus; Penstemon speciosus* Community 3; 2 on S slopes; elements of 6 and 7 in the understory
B 6/27/92 7/18/92	Eastern slopes of Sawmill Mt. Coarse soil Elevation 8380-8450 ft Slope 5-10° Exposure ENE-facing, 80°	*Abies concolor; Pinus jeffreyi; Astragalus purshii var. tinctus; Lupinus elatus; Penstemon speciosus; Eriogonum nudum ssp. ?pubiflorum* Community 4 on N slopes; 2 on S slopes; elements of 6 and 7 in the understory
C 6/27/92 7/18/92	Southern slopes of Sawmill Mt./open ridge Coarse soil Elevation 8500-8590 ft Steep/gentle slopes 5-15°/3-5° Exposure south-facing 180°/300°	*Pinus jeffreyi; Symphoricarpos parishii; Ribes cereum; Eriogonum kennedyi; Chrysothamnus viscidiflorus; Lupinus elatus; Bromus breviaristatus; Abies concolor; Sarcodes sanguinea* Community 2; elements of 6 and 7 in the understory
D 6/27/92 7/18/92	Flats near summit of Sawmill Mt. Coarse soil, litter of pine needles Elevation 8660 ft Gentle slopes or flat Exposure eastward	*Pinus jeffreyi; Chrysothamnus viscidiflorus; Ribes cereum; Symphoricarpos parishii; Lupinus elatus; Collinsia torreyi var. wrightii; Calochortus invenustus* Community 2; elements of 6 in the understory; N slopes with some *Abies concolor* and rare *Pinus flexilis*
E 6/27/92 7/18/92	Flats at summit of Sawmill Mt./summit slopes Coarse/gravelly soil Elevation 8710-8800 ft Gentle flats 2-4°/slopes 10° Exposure northwest/SSW 200°	*Chrysothamnus viscidiflorus; Eriogonum kennedyi; Sitanion hystrix; Allium fimbriatum; Astragalus purshii var. tinctus; Pinus flexilis; Abies concolor; Pinus jeffreyi; Castilleja applegatei; Ceanothus cordulatus; Orobanche fasciculata; Gilia ?interior* Mixed; elements of communities 1, 4, and 3 on summit and N slopes; community 7 and elements of communities 6 and 5 on flats at the summit
F 6/27/92 7/18/92	Summit slopes, W side of Sawmill Mt. Fine to coarse or gravelly soil Elevation 8700 ft Slopes up to 5° Exposure westward	*Pinus jeffreyi; Ribes cereum; Symphoricarpos parishii; Lupinus elatus; Castilleja applegatei* Community 2
G 6/27/92 7/18/92	Meadow/seeps above, up to Sheep Campground Fine soil, dry to moist/wet Elevation 8300-8400 ft Slope 5-10° Wash slopes southwest/SSW 200°	*Iris missouriensis; Sisyrinchium ?halophilum; Juncus ?mexicanus; Achillea millefolium var. lanulosa; Mimulus guttatus; Helenium bigelovii; Calyptridium umbellatum; Pinus jeffreyi* Community 8; elements of communities 2 and 7
H 6/27/92	Slopes and flats Fine to coarse soil Elevation 8150-8200 ft Gentle slope 5° Exposure SE	*Chrysothamnus nauseosus ssp. ?mohavensis; Lupinus elatus; Chrysothamnus viscidiflorus; Eriogonum kennedyi; Eriogonum ?wrightii ssp. subscaposum; Sitanion hystrix; Castilleja applegatei; Calochortus invenustus; Penstemon speciosus; Pinus jeffreyi* Communities 6 and 7; scattered *Pinus jeffreyi* (open canopy); understory normal (reasonably dense)
I 6/27/92	Slopes Fine to coarse soil Elevation 7950-8150 ft Steep slopes 15-20° Exposure SSE Recent (?) fire at 7900 ft Mountain bike trail below 7900 ft	*Lupinus elatus; Chrysothamnus viscidiflorus; Sitanion hystrix; Ribes cereum; Pinus jeffreyi; Quercus chrysolepis; ?Prunus emarginata/virginiana* Community 2; elements of 6; *Pinus jeffreyi* trees denser above 8000 ft, scattered below (forest to woodland); oaks below 8000 ft; solitary and rare *Pinus monophylla* scattered below 7950 ft; understory sparse; 8000 ft elevation appears to be a boundary or transition zone between vegetation types (plant association 1 begins)

Table 1. Locations Surveyed with Dates, Sawmill Mountain CRNA
(pg 2 of 3)

Location Date	Physical Characteristics	Overstory and Understory Species Ranked by Dominance Plant Communities and Associations Observed *
J 6/27/92	Slopes Coarse soil Elevation 7750-7850 ft Steep slopes 15-20° Exposure southward Mountain bike trail continues	*Chrysothamnus nauseosus ssp. ?mohavensis;* *Chrysothamnus viscidiflorus; Eriogonum kennedyi;* *Pinus jeffreyi; Quercus chrysolepis;* *Monardella linoides ssp. oblonga;* *Achillea millefolium var. lanulosa; Pinus monophylla* Plant association 1; elements of communities 2, 6 and 7
K 6/27/92	Slopes Coarse soil Elevation 7590 ft Steep slopes 15-20° Exposure SSE	*Pinus jeffreyi; Chrysothamnus nauseosus ssp. ?mohavensis;* *Lupinus elatus; Eriophyllum confertifolium;* *Quercus chrysolepis; Eriogonum kennedyi; Castilleja applegatei;* *Achillea millefolium var. lanulosa; Sitanion hystrix;* *Koeleria ?macrantha* Community 2; elements of 6 and 7; plant association 1; overstory denser than at I and J
L 6/27/92	Slopes, open canopy Coarse soil Elevation 7400-7440 ft Steep slopes 15° Exposure southward	*Pinus jeffreyi; Quercus chrysolepis; Symphoricarpos parishii;* *Lupinus excubitus var. austromontanus; Sitanion jubatum;* *Chaenactis santolinoides; Chrysothamnus viscidiflorus;* *Chrysothamnus nauseosus ssp. ?mohavensis; Eriogonum kennedyi;* *Eriogonum nudum ssp. ?pubiflorum; Phacelia ?imbricata* Community 2, plant association 1 at lower elevation range; community 6 at higher range
M 6/27/92	Creek with water-dry meadow in wash Fine to coarse soil Elevation 7050-7120 ft Gentle slopes about 5° Exposure southward	*Pinus jeffreyi; Quercus chrysolepis; Salix ?lasiolepis;* *Lupinus latifolius; Symphoricarpos parishii; Mimulus moschatus;* *?Prunus emarginata/virginiana;* dry part of wash with *Chrysothamnus nauseosus ssp. ?mohavensis;* *Equisetum laevigatum; Artemisia dracunculus; Sarcodes sanguinea* Plant association 2 at lower range; elements of community 2 and association 1; elements of communities 8 and 6 at higher range
N 6/27/92	Dry slopes/edge of wash-wash with water Coarse to fine soil Elevation 6900-6960 ft Gentle slopes about 5° Exposure SSE	*Pinus jeffreyi; Quercus chrysolepis; Salix ?lasiolepis;* *Bromus breviaristatus; Aquilegia formosa var. truncata;* *Potentilla ?glandulosa ssp. reflexa;* dry part of wash with *Galium andrewsii; Lotus procumbens; Penstemon labrosus;* *Castilleja applegatei; Sitanion jubatum; Koeleria ?macrantha* Elements of community 2 and association 1 at lower range with scattered pine and rare oak; association 2 at higher range
O 6/27/92	Open dry wash, sparsely vegetated Coarse soil Elevation 6790 ft Gentle slopes about 3° Exposure southward	*Chrysothamnus nauseosus ssp. ?mohavensis; Eriogonum kennedyi;* *Lupinus excubitus var. austromontanus; Gilia ?interior; Sitanion jubatum;* *Eriophyllum confertifolium; Delphinium parishii ssp. purpureum;* *Pinus jeffreyi; Pinus monophylla* Elements of communities 6, 7 and 2
P 6/27/92	Creek with water, edges of wash Fine to coarse soil Elevation 6740 ft Gentle slopes about 5° Wash flow and exposure SSE	*Salix ?lasiolepis; Cercocarpus ledifolius;* *Zauschneria californica; Potentilla ?glandulosa ssp. reflexa;* *Artemisia dracunculus; Penstemon labrosus;* dry edges of wash with *Gayophytum diffusum ssp. parviflorum; Linanthus aureus;* *Eriastrum sparsiflorum; Phacelia curvipes; Solanum xantii;* *Frasera neglecta; Pinus jeffreyi* Plant association 2; elements of communities 2 and 5
Q 6/27/92	Open dry slopes, scattered trees Coarse soil Elevation 6700 ft Gentle slopes about 5° Exposure SSE	*Pinus jeffreyi; Chrysothamnus nauseosus ssp. ?mohavensis;* *Eriogonum kennedyi; Lupinus excubitus var. austromontanus;* *Sitanion jubatum; Erigeron foliosus var. stenophyllus;* *Koeleria ?macrantha; Astragalus purshii var. tinctus;* *Phacelia ?imbricata; Eriogonum nudum ssp. ?pubiflorum;* *Eriogonum ?wrightii ssp. subscaposum* Elements of communities 2, 6, 7 and 5

Table 1. Locations Surveyed with Dates, Sawmill Mountain CRNA
(pg 3 of 3)

Location Date	Physical Characteristics	Overstory and Understory Species Ranked by Dominance Plant Communities and Associations Observed *
R 7/18/92	Northern slopes of Sawmill Mt. Coarse to gravelly soil Elevation 8450 ft Gentle slopes 5-7° Exposure westward	*Pinus jeffreyi; Abies concolor; Symphoricarpos parishii; Chrysothamnus viscidiflorus; Ribes cereum; Castilleja applegatei* Community 3 with relatively high cover of *Abies concolor*; elements of 6 in the understory
S 7/18/92	Northern slopes of Sawmill Mt. Fine moist soil Elevation 8330 ft Slopes 5-10° Exposure NNW 350°	*Abies concolor; Ribes cereum; Erysimum capitatum; Delphinium parishii ssp. purpureum; Viola ?purpurea; Collinsia torreyi var. wrightii; Silene bernardina; Allium campanulatum* Community 4 with scattered *Pinus jeffreyi* in open areas
T 7/18/92	Northern slopes of Sawmill Mt. Fine to coarse soil, pine needle litter Elevation 8290 ft Gentle slopes 5° Exposure ENE 80°	*Pinus jeffreyi; Abies concolor; Symphoricarpos parishii; Ribes cereum; Castilleja applegatei; Lupinus elatus; Penstemon labrosus; Delphinium patens ssp. montanum* Community 3 with scattered *Abies concolor*; dense forest with many saplings of both tree species
U 7/18/92	Northern slopes of Sawmill Mt. Fine to coarse moist soil Elevation 8330 ft Slope 10° Exposure NNE 10°	*Abies concolor; Ribes cereum; Erysimum capitatum; Delphinium parishii ssp. purpureum; Viola ?purpurea; Collinsia torreyi var. wrightii; Pedicularis semibarbata* Community 4 with scattered *Pinus jeffreyi* on eastern slopes; dense forest with seedlings and many saplings of *Abies concolor*
V 7/18/92	Start of northern wash on Sawmill Mt. Fine moist soil Elevation 8250 ft Slope 5-10° Exposure NNW 350°	*Abies concolor; Ribes cereum; Erysimum capitatum; Delphinium parishii ssp. purpureum; Viola ?purpurea; Collinsia torreyi var. wrightii; Pedicularis semibarbata* Community 4, dense forest with seedlings and saplings of *Abies concolor*

Note: Species nomenclature follows Munz and Keck (1968); Munz (1974); and Smith (1976).
Locations are all mapped in Figure 2.

* Plant Communities (communities 1-8 defined in Parikh and Capralis, 1988; community numbers and page numbers in parentheses defined in Holland, 1986):

1 Southern California Subalpine Forest (86500, p. 122)
2 Jeffrey Pine Forest (85100, p. 111)
3 Jeffrey Pine/White Fir Forest (85210, p. 112)
4 Southern California White Fir Forest (85320, p. 114)
5 Montane Chaparral (?37510-20-30, p. 23-25)
6 Rabbitbrush Scrub (35400, p. 16)
7 Subalpine Fell-field Cushion (?91130, p. 125)
8 Montane Meadow (45100, p. 41)

Plant Associations:

1 *Pinus jeffreyi/Quercus chrysolepis* (woodland: oaks occur from 6820-8000 ft, and drop out below 6820 ft)
2 *Salix ?lasiolepis/Cercocarpus ledifolius/Lupinus latifolius* (dry wash with flowing creek, overstory *Pinus jeffreyi*)

Table 2. Plant Species List, Sawmill Mountain CRNA
Compiled by Anuja Parikh from Surveys 6/92, 7/92
(page 1 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Amaryllidaceae	*Allium campanulatum*	S	R	SM 54
Amaryllidaceae	*Allium fimbriatum* var. *fimbriatum*	A,C,E,J	S-O	SM 42,70
Asteraceae	*Achillea millefolium* var. *lanulosa*	J,K	O	SM 36
Asteraceae	*Artemisia dracunculus*	B,M,P	S	
Asteraceae	*Chaenactis santolinoides*	L,M	C,O	SM 33
Asteraceae	*Chrysothamnus nauseosus* ssp. *?mohavensis*	H-M,O,Q	O-C	
Asteraceae	*Chrysothamnus viscidiflorus*	A-L,R,T	O-C	
Asteraceae	*Erigeron foliosus* var. *stenophyllus*	Q	C	SM 6
Asteraceae	*Eriophyllum confertifolium*	K,O	O	SM 22
Asteraceae	*Helenium bigelovii*	G	O-C	SM 77
Asteraceae	*Madia elegans* ssp. *wheeleri*	C	S	SM 67
Boraginaceae	*Cryptantha ?echinella*	U	R	SM 49
Brassicaceae	*Erysimum capitatum*	all	S-O	SM 41
Caprifoliaceae	*Symphoricarpos parishii*	all	O-A	
Caryophyllaceae	*Silene bernardina*	S	O	SM 45
Cyperaceae	*Carex ?athrostachya* (small, wide spike)	P	O	SM 8
Cyperaceae	*Carex douglasii*	A-F	S,O	SM 56
Cyperaceae	*Carex* sp. (large, wide spike)	P	S	SM 7
Cyperaceae	*Eleocharis ?bernardina*	G	C	SM 80
Equisetaceae	*Equisetum laevigatum*	M	O	SM 29
Ericaceae	*Sarcodes sanguinea*	C,M	R	
Fabaceae	*Astragalus purshii* var. *tinctus*	B-M	S-C	SM 68
Fabaceae	*Astragalus whitneyi*	A-E	S-O	SM 65
Fabaceae	*Lotus davidsonii*	C-F,R	O	SM 69
Fabaceae	*Lotus procumbens*	N,O,Q	S	
Fabaceae	*Lupinus breweri* var. *bryoides*	all	S-C	SM 38
Fabaceae	*Lupinus elatus*	all	C-A	SM 34
Fabaceae	*Lupinus excubitus* var. *austromontanus*	L,O,Q	O	SM 23,24
Fabaceae	*Lupinus latifolius*	M,N,P	O,C	SM 28
Fagaceae	*Quercus chrysolepis*	I-N	O,S	
Gentianaceae	*Frasera neglecta*	P	O	SM 1
Grossulariaceae	*Ribes cereum*	A-I,R-V	O-C	
Grossulariaceae	*Ribes ?velutinum* var. *glanduliferum*	A-D,R-V	R-S	
Hydrophyllaceae	*Phacelia curvipes*	P,V	S	SM 17,47
Hydrophyllaceae	*Phacelia douglasii*	F,G,P	O	SM 16
Hydrophyllaceae	*Phacelia ?imbricata* ssp. *imbricata*	L,Q	O	SM 4
Hydrophyllaceae	*Phacelia* sp. (transparent petals)	G,O	O	SM 21
Iridaceae	*Iris missouriensis*	G	A	SM 39
Iridaceae	*Sisyrinchium ?halophilum*	G	O	SM 75
Juncaceae	*Juncus ?mexicanus*	P	O	SM 12
Juncaceae	*Juncus macrandrus*	M,G	S,O	SM 32,78

Table 2. Plant Species List, Sawmill Mountain CRNA
Compiled by Anuja Parikh from Surveys 6/92, 7/92
(page 2 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Lamiaceae	*Monardella linoides* ssp. *oblonga*	J,O	S	SM 40
Lamiaceae	*Stachys albens*	G	S	SM 73
Liliaceae	*Calochortus invenustus*	A,C,H,N	O	SM 71
Linaceae	*Linum ?lewisii*	G	O	SM 84,85
Loasaceae	*Mentzelia* sp.	F	R	
Onagraceae	*Epilobium ?brevistylum*	G	S	SM 83
Onagraceae	*Gayophytum diffusum* ssp. *parviflorum*	A,F,P	O	SM 11
Onagraceae	*Zauschneria californica* ssp. *?latifolia*	P	S	SM 15
Orchidaceae	*Habenaria ?sparsiflora*	G	S	SM 79
Orobanchaceae	*Orobanche fasciculata* (on *Eriogonum* spp.)	E	R	SM 59
Pinaceae	*Abies concolor*	A-E,R-V	S-A	
Pinaceae	*Pinus flexilis*	A-E	R-O	
Pinaceae	*Pinus jeffreyi*	all	O-A	
Pinaceae	*Pinus monophylla*	I,J,O	R	
Poaceae	*Bromus breviaristatus*	C,N	O,R	SM 66
Poaceae	*Deschampsia cespitosa*	G	O	SM 76
Poaceae	*Koeleria ?macrantha*	K,N,Q	C	
Poaceae	*Sitanion hystrix*	A,E,H-K	O	
Poaceae	*Sitanion jubatum*	L-Q	O,C	
Poaceae	*Stipa nevadensis*	A	S	SM 61,62
Polemoniaceae	*Eriastrum sparsiflorum*	P	R	
Polemoniaceae	*Gilia ?interior* (lavender, large flr)	E,P,O	O,C	SM 18,19,58
Polemoniaceae	*Gilia* sp. (small, purple flr)	T	S	SM 50,51,52
Polemoniaceae	*Leptodactylon pungens* ssp. *hallii*	C-E,R	S	SM 57
Polemoniaceae	*Linanthus aureus*	P	R	SM 20
Polygonaceae	*Eriogonum kennedyi*	C-L,O,Q	S-C	
Polygonaceae	*Eriogonum nudum* var. *?pubiflorum*	B,L,Q	O	SM 3
Polygonaceae	*Eriogonum ?wrightii* ssp. *subscaposum*	H,Q,E	O-C	SM 5,60
Portulacaceae	*Calyptridium umbellatum*	A-Q,R,T	R-O	SM 37
Ranunculaceae	*Aquilegia formosa* var. *truncata*	G,N	R,S	SM 26,27
Ranunculaceae	*Delphinium parishii* ssp. *purpureum*	A,O,S-V	O	SM 25
Ranunculaceae	*Delphinium patens* ssp. *montanum*	T	R	SM 53
Rhamnaceae	*Ceanothus cordulatus*	E	O	
Rosaceae	*Cercocarpus ledifolius*	P	C	SM 43
Rosaceae	*Ivesia santolinoides*	E	S	SM 55
Rosaceae	*Potentilla ?glandulosa* ssp. *reflexa*	N,P,G	S-O	SM 2,74
Rosaceae	*Prunus ?emarginata/virginiana*	I,M	R	
Rubiaceae	*Galium andrewsii*	N	O	
Salicaceae	*Salix ?lasiolepis*	M,N,P	C	SM 44
Scrophulariaceae	*Castilleja applegatei*	all	R-C	SM 63,64
Scrophulariaceae	*Castilleja stenantha*	G	S	SM 72

Table 2. Plant Species List, Sawmill Mountain CRNA
Compiled by Anuja Parikh from Surveys 6/92, 7/92
(page 3 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Scrophulariaceae	*Collinsia torreyi* var. *wrightii*	D-G,S-V	S-O	SM 46
Scrophulariaceae	*Mimulus guttatus*	M,G	O,C	SM 30,81
Scrophulariaceae	*Mimulus johnstonii*	P	S	SM 13
Scrophulariaceae	*Mimulus moschatus* var. *?sessilifolius*	M	S	SM 31
Scrophulariaceae	*Mimulus pilosus*	P	O	SM 14
Scrophulariaceae	*Mimulus primuloides* var. *?pilosellus*	G	O	SM 82
Scrophulariaceae	*Pedicularis semibarbata*	C-F,R-V	S-O	SM 48
Scrophulariaceae	*Penstemon labrosus*	N-Q,R,T	S-C	SM 9
Scrophulariaceae	*Penstemon speciosus*	A,B,H	O	SM 35
Solanaceae	*Solanum xantii*	P	R	SM 10
Violaceae	*Viola ?purpurea*	S-V	S	

* Location: see Table 1 and Figure 2.

** Abundance:
A abundant;
C common;
O occasional;
S scattered;
R rare.

*** Voucher#: Plant collections deposited at the Herbarium, Santa Barbara Botanic Garden. Species identified with the help of Clif Smith. Species ID tentative for some specimens.

Species Nomenclature: Munz and Keck (1968); Munz (1974); Smith (1976).

Table 3. Vegetation Sampling Results, Sawmill Mountain CRNA

Maximum Dbh of *Abies concolor* in centimeters	114.30
Minimum Dbh of *Abies concolor* in centimeters	3.30
Mean Dbh of *Abies concolor* in centimeters	29.80
Maximum Dbh of *Pinus jeffreyi* in centimeters	153.10
Minimum Dbh of *Pinus jeffreyi* in centimeters	3.00
Mean Dbh of *Pinus jeffreyi* in centimeters	50.02
Mean Basal Area of all trees in square meters	0.2729
Maximum Basal Area of *Abies concolor* in square meters	1.0261
Minimum Basal Area of *Abies concolor* in square meters	0.0009
Mean Basal Area of *Abies concolor* in square meters	0.1442
Maximum Basal Area of *Pinus jeffreyi* in square meters	1.8409
Minimum Basal Area of *Pinus jeffreyi* in square meters	0.0007
Mean Basal Area of *Pinus jeffreyi* in square meters	0.3130
Total Density of all trees per hectare	156.35
Total Density of *Abies concolor* per hectare	~~302.28~~ 37.16
Total Density of *Pinus jeffreyi* per hectare	~~132.18~~ 119.18
Relative Density of *Abies concolor* ~~per hectare~~	~~37.16~~ .24
Relative Density of *Pinus jeffreyi* ~~per hectare~~	~~119.18~~ .76
Basal Cover/dominance of *Abies concolor* in sq m per ha	5.36
Basal Cover/dominance of *Pinus jeffreyi* in sq m per ha	37.31
Mean Height of all trees in meters	12.06
Maximum Height of *Abies concolor* in meters	20.00
Minimum Height of *Abies concolor* in meters	2.00
Mean Height of *Abies concolor* in meters	8.76
Maximum Height of *Pinus jeffreyi* in meters	35.00
Minimum Height of *Pinus jeffreyi* in meters	2.00
Mean Height of *Pinus jeffreyi* in meters	13.09
Total Seedling Numbers in sampled plots: *	
Abies concolor	127
Pinus jeffreyi	7
Total Sapling Numbers in sampled plots: *	
Abies concolor	17
Pinus jeffreyi	18

* Seedlings, Saplings, and Trees were defined by height:
Seedlings < 0.25 m tall
Saplings > 0.25 m tall, < 1.5 m tall
Trees > 1.5 m tall